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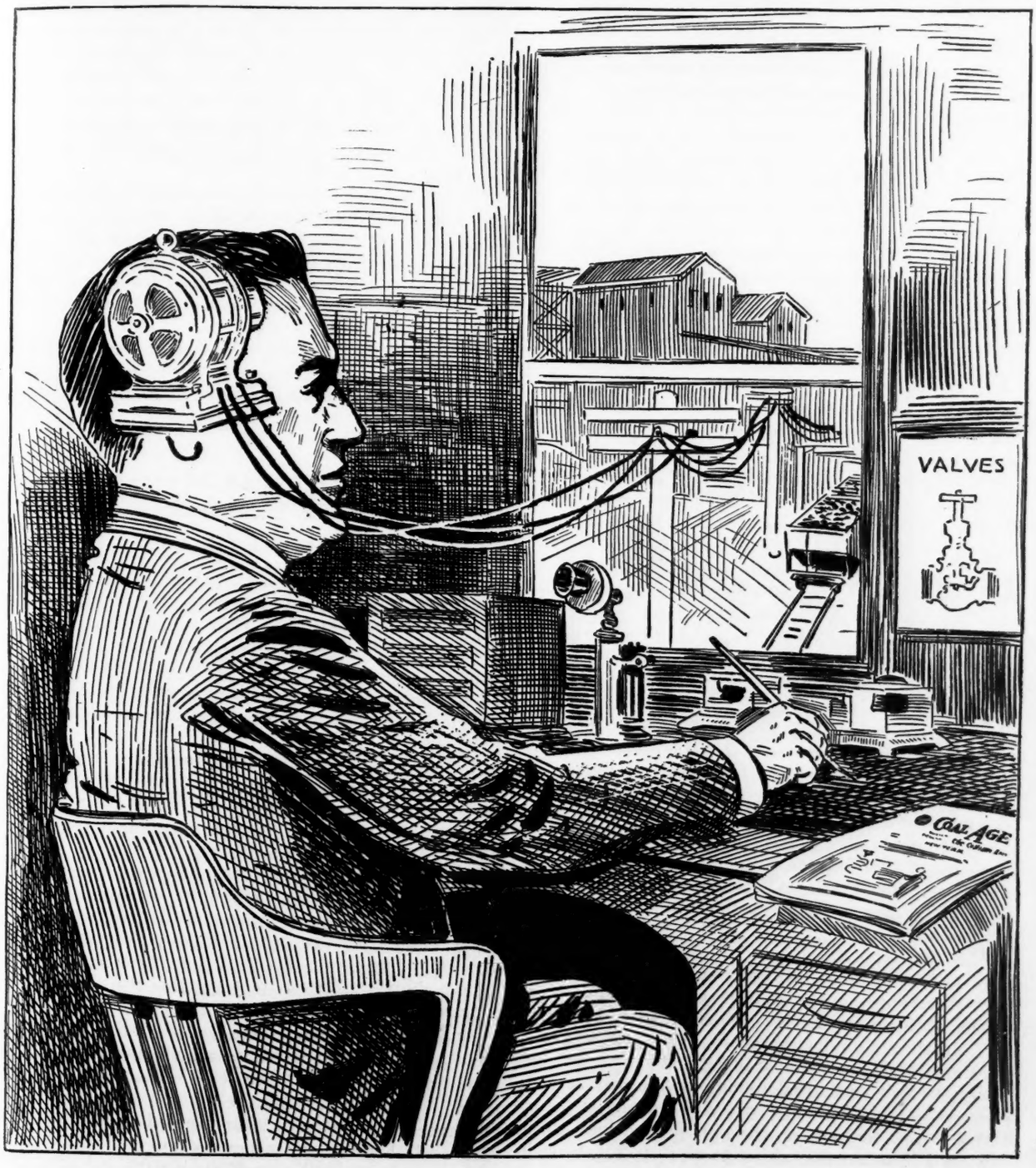


Knowledge Is Power.
It Is What You Know That Makes Things Go.
Improve Each Hour and Thus Gain Power.

—Suggested by a Kentucky mine superintendent.

Ideas and Suggestions

Why Write Under Cover?

By S. C. Reynolds*

"It is surprising to find how many coal-mine officials are opposed, under any and all circumstances, to their employees writing for publication."

This was the gist of a foreword in *Coal Age* of Feb. 12. The foreword declared that "This is true in spite of the fact that no business at the present time is more in need of publicity." And as a parting shot it asked, "Why?"

Considering the preponderance of articles appearing in this journal under fictitious signatures, a reader would be well-nigh justified in concluding that authors writing on practices in the coal industry had best divulge their information under cover, in order to escape the penalty of detection.

But why the penalty of detection? What is there in an industry conducted aboveboard that officials should wish to hide? Now and then, of course, in some special minor phase of operation, there may be a trade secret that ordinary business prudence guards from publicity. But we are concerned only with the more vital affairs affecting operator and employee.

Several years ago I experienced the peculiar aversion of the mine management which compels mining men to write under cover if they wish to write at all for trade publications. At that time I was engaged in safety work, and I published a paper on the subject. No one could have benefited more from it than the employers. I soon learned, however, that I had broken a certain unwritten law of the management and had invoked its condemnation. The general manager informed me that suggestions worthy of publication would be more favorably received in my weekly reports.

Shortly afterward a friend of mine, a practical official, prepared a paper to be read at a coal-mining institute. The paper was an excellent one, presenting original researches of vital importance to mining men; but it was never read. The "old man" at headquarters opposed it, although he gave no more specific reason than, "Well, just don't read it."

Mine inspectors, because of the comprehensiveness of their work, should be constant sources of better practice. Yet relatively few of them give the industry the benefit of their experience. This is particularly true of Pennsylvania's mine inspectors, who, through their knowledge of diverse methods of mining and of the various seams and the natural conditions, are best fitted to advise as to the welfare and safety of the men in the industry. And they, as a whole, have remained silent.

When I broached the subject to an inspector, he smilingly said: "Well, there's the annual report on tonnage, new equipment, number of men killed and injured, isn't there?" And when I remarked that his statement was stereotyped, he continued enigmatically: "True; but, considering the way the wind blows, I — er — I believe it best to take this umbrella, don't you?"

What an inert world if for all men the natural and God-given—but sometimes man-taken—right of free expression had been crushed! The world's progress—and coal mining with it—owes much to men who have had ideas, have carried them out successfully or proved their fallacy, and through the press have given freely of their knowledge and experience.

Until this was possible on a comparatively large scale, men worked and died—or got killed—utterly ignorant of progress or retrogression, even in the adjoining community. The broadening intellect, the general comparative safety, the shorter working day and rising wages are all in large measure the result of disseminating ideas through printers' ink.

Industry is yet to be injured by the honest discussion of its pros and cons in technical journals. And probably no industry is so sadly in need of healthy discussion as that of coal mining.

*Houston, Penn.

Competent Mine Management and Contracts

By John E. Ambrose

Many mine managers are unaware of the fact that they may be paying too much for the sinking of air shafts at their operations. They no doubt feel confident of their price judgment because they know how to calculate the number of cubic yards in a lineal yard of shaft, and because they are familiar with prices paid in their district. But there are other items to be taken into consideration.

Contractors sinking air shafts, naturally, have at hand the necessary outfit—compressors, drills, pumps, etc.—which the mining company is lacking, and for this reason managers may take it for granted that contractors can do the work more economically.

But they cannot. We will suppose the air shaft to be sunk is 16x16 ft., timbered, and 200 ft. deep. It would contain, 1,896⅓ cu.yd. Assuming the contractor's price to be $4.50 per cubic yard, or $1.28 per lineal yard, the cost would be $8,533.50. This price, of course, does not include timbering the shaft, concreting the top of it, and many other items.

The wideawake mine manager, in finding his cost of the work, would allow $825 for timbering 200 ft. (6-ft. centers, 33 sets at $25 per set). After estimating the cost of concreting around the top of the shaft he would determine the amount of labor required in a certain time. He would buy a rebuilt compressor, of sufficient capacity to run two rock drills, for $500 or $600, and three rock drills, mountings, etc.

If the location of the airshaft were not too far away from the boiler plant, a steam line could be laid to run the compressor and pumps.

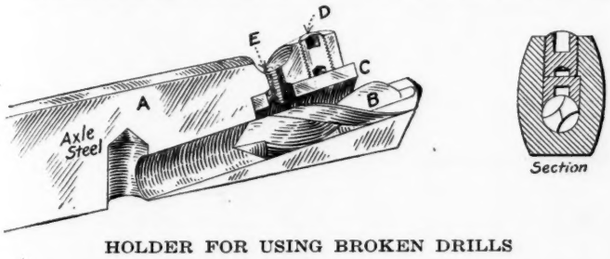
He would now put on three shifts of men, each shift consisting of one engineer, one compressor man, two topmen, two drill runners, two helpers, four muckers, one shift leader. These would cost $37 a shift, or $111 a day.. Adding to this the superintendence, oil, dynamite and other incidentals, the cost would be $126.50 a day of three shifts.

If we assume that in 24 hr. they could excavate 4 ft. of shaft, our cost per lineal foot of shaft would be $31.62. The contractor's price was $42.66 per lineal foot, so that the saving would amount to $11.04 per lineal foot, or $2,208 for the job.

Using Broken Drills for Turning Tools

Here is an economical little device that cuts down tool-steel expense. It is a tool holder made of a size best suited to the use to which it is to be put, and is described by Joseph K. Long in *American Machinst.*

The drill holder, or rather tool holder, is illustrated at *A*.



HOLDER FOR USING BROKEN DRILLS

B is a drill, which is properly ground for turning; *C*, a clamp that holds the drill in place; *D*, a setscrew for tightening the clamp. The drill *E* is a small screw that prevents the clamp from getting lost when the device is not in use.

This contrivance works well, as drills are usually made of a good grade of steel, and it reduces tool-steel expense by making use of the broken drills for cutting tools.

"Eat Cheese"

By H. L. Hanley*

There is a New York lawyer managing the property of a coal company in one of our Western states. The manager is a strong-headed man and is wont to make decisions arbitrarily. In such cases he will not take the advice of others.

The company owns a valuable piece of coal land which has a rather poor frontage along the railroad. There is also a piece of land owned by some individuals that is the natural key to the company's property. It would be possible for the corporation to open up its property without obtaining the other land, but it would require a much more difficult system of haulage and a more expensive method of mining.

Several years ago the coal company was offered the other land at an extremely reasonable price. The manager would not buy it thinking that he could get it at his own figure whenever he needed it. The company now needs the property badly, but the other people are holding out for a fancy price which they will get sooner or later. The manager again refuses to listen to the advice of his associates, saying that he would rather his coal would cost him twice as much per ton than that the other fellow should gain his point.

One time a rat was caught in a wire cage which was baited with a large piece of cheese. When the owner of the cage arrived on the scene the rat was contentedly eating at the cheese. It would pay all of us to make the best of conditions when we are the victims of circumstances.

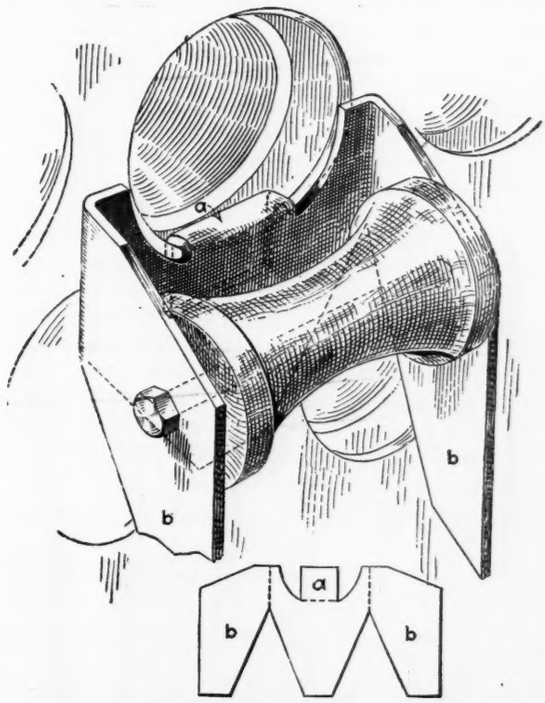
The manager is undoubtedly beaten at his own game and it would pay him to concede that point at this time rather than to make more blunders in order to spite his enemies. In other words it would pay him to "Eat cheese."

*Ruth, Nev.

Protecting Tube-Cleaner Hose

The illustration shows a device to eliminate the wear and tear on hose supplying air, steam or water to cleaners used for removing scale from the tubes of water-tube boilers, says Wayne G. Brookins of Lyons, N. Y., in a recent issue of *Power*.

It is often necessary to draw the hose to which the cleaner is attached back and forth several times, and



ROLLER IN POSITION ON HEADER

each time it comes in contact with the sharp edges of the handhole, soon wearing the wire or plies of the hose and causing a leak or blowout.

To overcome this a simple device was made by cutting and drilling a sheet of 1/8-in. flat iron and bending the throat piece *a* down so as to form a tongue to fit over the edge of the handhole opposite the tube to be cleaned. The two side pieces *b* were bent at the dotted lines to form the sides, for holding a hardwood roller about 5 in. long, turned upon a lathe, and turning on a 3/8-in. bolt put through the roller and iron side supports. The roller revolves backward and forward with the motion of the hose.

Chemistry in Coal Mining

By A. G. Blakeley*

SYNOPSIS—The preparation of coal for market, the treatment of mine water for boiler feeding or other purposes, the analysis and selection of explosives, the fireproofing of mine timber and brattice cloth, the care of rescue apparatus, the analysis of mine gases, the compounding of illuminants and lubricants, the alloying of acid-resisting metals, as well as the utilization of various waste products, are all fields of activity for the coal-mine chemist.

The chemical control or testing of the preparation of anthracite coal is concerned mostly with the material as it enters and leaves the breaker. This paper will refer, however, to the question of coal underneath the surface.

The testing of coal sampled in the mine is sometimes undertaken for special purposes, also for matter of information, and even occasionally to show the quality of fuel which the breaker should turn out under good working conditions. Coal is a cheap commodity, and it is not practicable for a large company to keep separate the coal from different beds in a mine. Except, then, for matters of information or for special purposes, I would not recommend the testing of coal as sampled in the mine.

There are times, however, when it might be advisable to note how the coal in a certain section or bed in a mine will analyze, for the purpose of determining whether it is worth while to bring this coal to the surface. The usual practice in taking a mine sample is to cut a strip across the full width of the bed, catching the coal as it falls upon a rubber apron, canvas or other suitable cloth. In taking such samples it is common practice to include only the coal and bone, leaving out any slate, this practice being based upon the assumption that the breaker will remove the slate, but not the bone, from the original material. It may be of interest to notice several samples taken by myself, showing the differences in the coal, with and without the bone as shown in Table 1.

TABLE 1. VARIATION IN COAL SAMPLES WITH AND WITHOUT BONE

	Test No.	Specific Gravity	Moisture, Per Cent.	Volatile Matter, Per Cent.	Fixed Carbon, Per Cent.	Ash, Per Cent.	Sulphur, Per Cent.	Phosphorus Per Cent.
No bone included	C-4138	1.60	4.46	3.80	83.21	8.53	0.47	0.013
Bone included	C-4139	1.63	4.46	4.53	75.58	15.43	0.43	0.019
No bone included	C-4140	1.62	3.80	3.30	81.52	11.38	0.59	0.043
Bone included	C-4141	1.66	3.80	3.88	73.60	18.72	0.75	0.050

The mine samples will show great variation in percentage of ash, depending in large part upon the number of partings between the sections of coal. To illustrate this fact, attention is called to six samples taken in the same mine, the percentage of ash in these six samples being approximately 10, 12, 16, 18, 21 and 40 per cent. The sample showing 40 per cent. of ash is of course practically all bony material.

The question has often been asked how much ash is found in "pure" coal. The percentage of ash in coal varies much. Table 2 shows a series of analyses of coal samples from the Mammoth bed taken at different mines. The mines have been designated simply by numbers. In each case samples *A* and *B* might be regarded as duplicates. Duplicate samples represent a lump from the same mine, the lump having been especially selected, free from even the slightest quantity of bone or slate, as far as could be judged by the eye. Table 3 represents some more selected lumps from different beds, these lumps, however, having been selected with less care; that is, the lump may contain small quantities of bone or even slate.

In submitting these analyses I wish to make it plain that the samples represent simply picked lumps.

TABLE 2. ANALYSES OF SAMPLES FROM DIFFERENT MINES IN THE MAMMOTH BED

Test No.	Iron, Per Cent.	Moisture, Per Cent.	Volatile Matter, Per Cent.	Fixed Carbon, Per Cent.	Ash, Per Cent.	Sulphur, Per Cent.	Heating Value per Lb. Dry Coal, in B.t.u.
No. 1 Colliery							
C-6046A	0.13	2.46	2.89	89.67	4.98	0.77	14,080
C-6046B	0.15	2.30	3.08	87.76	6.86	0.61	13,720
No. 2 Colliery							
C-6047A	0.19	2.12	1.86	94.33	1.69	0.41	14,500
C-6047B	0.15	2.23	1.92	93.08	2.77	0.40	14,330
No. 3 Colliery							
C-6048A	0.23	3.26	2.59	90.16	3.99	0.48	14,180
C-6048B	0.13	2.78	3.28	91.75	2.19	0.43	14,510
No. 4 Colliery							
C-6049A	0.15	3.26	2.31	91.85	2.58	0.46	14,450
C-6049B	0.11	3.07	2.57	91.49	2.87	0.50	14,340
No. 5 Colliery							
C-6267A	0.21	4.36	2.82	91.68	1.14	0.26	14,700
C-6267B	0.15	4.23	2.92	89.81	3.04	0.26	14,300
No. 6 Colliery							
C-6269A	0.11	2.00	3.16	91.80	3.04	0.35	14,470
C-6269B	0.11	2.30	2.77	92.06	2.87	0.34	14,470

TABLE 3. ANALYSES OF SELECTED LUMPS

Colliery	Bed	Moisture, Per Cent.	Volatile Matter, Per Cent.	Fixed Carbon, Per Cent.	Ash, Per Cent.
No. 7	Bottom Split	3.31	1.41	90.79	4.49
No. 8	Little Tracy	4.53	1.85	85.70	7.92
No. 9	West Primrose	4.28	2.53	86.80	6.39
No. 10	Four Foot	4.70	1.70	89.09	4.51
No. 11	Orchard	3.69	2.44	88.74	5.13
No. 12	Buck Mountain	2.34	2.86	86.07	8.73

Coal from different beds, and hence coal from different mines, shows great variation, not only in the percentage of ash, but in specific gravity, heating value, volatile matter, fusibility of ash, etc. I would like to point out a few matters in connection with the chemical analyses of different coals, and in doing so desire it understood that I am stating general rules as I have observed them and that I realize that there are many exceptions to these rules.

The heating values of anthracite coals of a given ash content may differ by several hundred B.t.u. The volatile matter shows a range of from about 1.5 to 9 per cent. The specific gravity of coal from different beds varies. As a general rule it may be said that anthracite coals of given ash content will show higher heating value with increasing content of volatile matter or decreasing specific gravity.

This rule is subject to some exceptions, notably that of dirt-bank coal or coal exposed to the weather for many years. These bank coals generally show a higher percentage of volatile matter than freshly mined coal from the same bed and somewhat lower heating value.

Attention is directed to the composition of volatile matter in coal. Tests have shown that the percentage of volatile matter increases with the percentage of ash from a given bed, which fact shows that the volatile matter

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consists in part of water of combination from the shale that forms the base of the coal ash.

The fusibility of coal ash and hence the clinkering properties of the fuel depend upon the composition of coal ash. I do not have sufficient data on hand on which to base statements as to whether there is any relation between the chemical composition of the ash and its fusing temperature. I submit Table 4 largely as a matter of information.

Anthracite coal from different beds certainly does have ash of different fusing temperatures. It is probable that extended work will show some relation between the chemical composition and the fusing temperature. As explanatory or additional to the table I would state that the content of alkalies in the ashes was not determined. The percentage of alumina includes any titanium dioxide present. Tests of a few ashes have shown approximately 1 per cent. titanium dioxide. The fusing temperatures were determined in an oxidizing atmosphere by comparison with Seger pyrometric cones.

TABLE 4—THE VARYING FUSIBILITY OF COAL ASH

Colliery	Fusing Temperature, Deg. F.	Silica, SiO_2, %	Alumina, Al_2O_3, %	Iron Oxide, Fe_2O_3, %	Calcium Oxide, CaO, %	Magnesium Oxide, MgO, %	Sulphuric Anhydride, SO_3, %	Phosphoric Anhydride, P_2O_5, %
No. 13	2210-2282	54.54	26.68	11.67	3.36	1.20	2.22	trace
No. 14	2210-2282	52.38	30.68	9.94	2.10	1.00	2.59	0.56
No. 15	2282-2390	55.43	26.81	9.14	3.76	1.85	1.52	0.48
No. 16	2282	56.35	29.91	9.54	0.98	1.10	0.51	0.40
No. 17	2462-2498	56.50	28.17	9.44	1.40	0.85	2.17	0.59
No. 18	2534	52.83	24.48	15.50	2.38	1.65	1.39	0.45
No. 19	above 2534	55.78	30.91	10.64	0.45	0.50	0.10	0.23
No. 20	above 2534	51.44	34.47	9.44	1.96	0.68	1.02	0.63
No. 21	above 2534	55.84	32.79	7.55	0.71	1.10	1.15	0.39
No. 22	above 2570	52.00	33.71	8.89	1.92	0.59	1.17	0.28
No. 23	above 2570	54.28	31.22	11.67	1.21	0.44	0.69	0.24
No. 24	above 2570	50.60	33.99	11.93	0.81	1.03	0.86	0.46
No. 25	above 2570	52.94	37.66	7.22	0.56	0.55	0.69	0.27

Whereas the most important tests for coal are, no doubt, usually ash and heating value, yet it is seen that anthracite can be classified by means of volatile matter, relative heating value, fusibility of ash and specific gravity. The specific-gravity determination of coal is often useful in determining the quantity of coal in a mine.

The composition of the coal ash and the physical structure or appearance of the material are both points that are sometimes useful in selecting a particular coal to be used for special purposes.

Only brief mention can be made here of the subject of anthracite coal dust. Fortunately, this material has so far not proved explosive, as has bituminous dust. It might be remarked that coal dust is as a rule higher in percentage of moisture, volatile matter and ash than is coal from the same mine.

It is a well-known fact that for every ton of anthracite hoisted from the mine a much greater number of tons of mine water has to be handled. At rainy periods of the year the quantity of mine water is much greater than during dry seasons.

It is rather difficult to give a good comprehensive definition of mine water. Mine waters may be of many and various characters, depending upon the strata through which the water finds its way. Table 5 is inserted to show the variety of mine water with which the writer has come in contact. Waters Nos. 1 and 2 represent those from the same colliery or mine. One water is strongly acid, while the other is quite alkaline in nature. Waters Nos. 3 and 4 represent samples taken from the same colliery on the same day. These two waters are entirely different in composition.

Sample No. 5 represents the most strongly acid water examined. This water fortunately was not encountered in large quantity, but found its way as a steady drip into a slope engine house. The water resembled a dark-brown syrup and had a strong odor of sugar. Chemical examination indicates that this water might be regarded as equivalent to an acid of over 15 per cent. strength.

Samples Nos. 6 to 10 inclusive represent ordinary mine waters showing varying amounts of acid.

Samples Nos. 11, 12 and 13 are mine waters of an alkaline nature. Sample No. 16 should give fairly good results as a boiler water. Sample No. 13 is an alkaline mine water containing sodium bicarbonate. This fact is indicated in the analysis in the table by the fact that the hardness is less than the alkalinity, showing that the alkalinity must be due in part to sodium bicarbonate.

Samples Nos. 14 and 15 are waters from mine drifts, one being acid and the other alkaline. Both these waters are being used successfully in steam boilers, sample No. 14 having the acidity first properly neutralized. Samples Nos. 17 and 18 represent water after draining through dirt banks.

In speaking further of mine water in general, I would say that I will refer to the ordinary acid water such as represented by analyses 6 to 10. This water is of a strongly corrosive nature, having a very destructive action upon various metals, iron or steel especially. Its action on concrete is spoken of elsewhere. The action upon wood is not so marked, and wood-lined pipes and wooden troughs are being used successfully for conveying mine water.

The utilization of mine water, which is an expensive waste product, offers opportunity for investigation. One

TABLE 5. ANALYSES OF SEVERAL MINE WATERS*

	Appearance	Free Sulphuric Acid, H_2SO_4	Total Acidity Calculated as Sulphuric Acid, H_2SO_4	Free Carbon Dioxide, CO_2	Alkalinity Calculated as Calcium Carbonate, $CaCO_3$	Oxides of Iron and Aluminum, Fe_2O_3, Al_2O_3	Calcium Oxide, CaO	Magnesium Oxide, MgO	Sulphuric Anhydride, SO_3	Silicon, SiO_2	Organic and Volatile Matter	Total Solids	Hardness
1	Turbid, yellow	....	....	11	130	42	231	126	550	21	245	1,291	....
2	Turbid	372	1,607	....	....	934	227	99	1,978	54	not determined	3,906	....
3	Clear	....	....	4	3	7	7	6	47	17	57	141	....
4	Slightly turbid	49	88	....	....	40	48	40	195	27	171	430	....
5	Dark-brown syrup	14,700	156,800	....	....	113,400	760	3,400	143,400	300	considerable	310,700	....
6	Turbid, yellow	93	397	....	....	158	391	174	1,222	32	457	2,419	....
7	Clear, yellow	412	706	....	....	366	163	62	1,122	41	795	2,189	....
8	Clear	701	1,205	....	....	831	127	24	1,567	52	1,295	3,421	....
9	Yellow	98	1,824	....	....	913	116	168	1,915	not determined		4,100	....
10	Yellow	622	3,725	....	....	1,676	489	631	6,037	not determined		10,083	....
11	Turbid	....	....	32	10	16	69	76	249	23	104	544	....
12	Turbid, yellow	....	....	4	110	11	101	40	152	11	75	423	....
13	Clear	....	....	20	205	none	57	48	264	not determined		698	185
14	Clear	trace	17	....	....	4	8	5	23	trace	15	48	....
15	Slightly turbid, yellow	....	....	22	15	13	2	trace	11	2	9	38	....
16	Clear	....	....	9	55	6	25	10	11	11	30	91	....
17	Clear	54	3,342	....	....	1,638	556	113	4,497	80	2,659	9,267	....
18	Red	18,130	20,776	....	....	not determined						48,779	....

*Figures represent parts per million.

great difficulty at once presents itself—namely, that the mine water after all is principally water. The total solid matter would probably not average more than about 0.3 per cent. In cases where the mine water is to be used to keep the boiler plants in operation or where the acidity must be neutralized before the water is allowed to run into streams or creeks the utilization of the solids present in the water might well be considered. I have had some little experience in the use of mine water in boilers. One of the old means of treating such water consisted simply in the neutralization of acid by means of ordinary lime. Such treatment left the water containing a large quantity of calcium sulphate or sulphate of lime. The water was consequently a very hard one and deposited an excessive amount of scale in the boilers.

Further treatment of this mine water, after neutralizing with lime, by means of soda ash resulted in a much softer water. One of the drawbacks to this treatment in the hands of the ordinary colliery employees was the lack of a satisfactory test to determine when sufficient soda ash had been added.

Another means of treating mine water, to render it fit for boiler purposes, consisted in the addition of soda ash alone. This treatment has been used with success at quite a number of plants. The precipitate or mud formed by the treatment of mine water would contain hydrates of iron and aluminum, magnesium hydrate, silica, calcium sulphate and calcium carbonate.

A treatment of mine water which would be somewhat more expensive, but which would give a much better water for boilers and hence would no doubt warrant the increased cost, would be the treatment of the mine water with barium hydrate. The barium sulphate formed is much more insoluble than calcium sulphate and would immediately be precipitated. The precipitate is heavy and this would assist in the rapid settling of the precipitate from the water. In order to get a more completely softened water, this barium hydrate treatment could be followed with a soda ash treatment such as in the case of a lime treatment. The precipitate formed could be worked up for use as a paint material. The utilization of the organic material present in mine waters should be given attention, as a careful research investigation might reveal a possible valuable byproduct.

Water From Dirt Banks Is Strong

In connection with the subject of mine water I cannot refrain from making a suggestion concerned with slate and dirt banks. As shown in Table 5, the water coming through dirt banks is strongly impregnated, and a lesson to be pointed out is that all refuse matter from the mines, such as culm, slate or rock, should be kept away from the stream or reservoir supplying the boiler plants. The placing of a dirt bank adjacent to a reservoir can result in making the reservoir water practically worthless.

One other point in connection with boiler feeding is the testing of water to see whether it is acid and, hence, corrosive. The old way was to use litmus paper. This indicator, even in the hands of one fairly expert in its use, is far from satisfactory. I would suggest the use of a solution of a chemical known as methyl red. If a few drops of this solution added to a water result in giving a slightly pink or red coloration, it is fairly safe to assume that the water tested will be corrosive to the boilers. If, on the other hand, the water takes on a yellow coloration, the water tested should not prove corrosive.

Chemical Tests of Explosives

The chemist can be of much use in the proper selection and testing of explosives. The selection of explosives must be subject to a number of considerations, such as time required to do a given amount of work, size of lumps or pieces to which coal or rock should be broken, possibility of firing of gases, and pollution of air by gases formed in blasting. These matters offer much chance for research work. At this time especially the chemist becomes useful in the testing of shipments of explosives, as changes in preparation are being made partly on account of conditions abroad.

As an example of such changes: Explosive No. 10 has been recommended to take the place of explosive No. 9 (see Table 6). Explosive No. 9 is what is ordinarily known as a 60 per cent. gelatin dynamite. Explosive No. 10 is a 60 per cent. gelatin, depending in part for its strength on its ammonium nitrate content. It is questionable whether these two explosives would give identical results in service.

As another example of change in explosives, reference is directed to explosives Nos. 2 and 3. These two explosives were purchased with the understanding that they were the same material. Analysis shows explosive No. 3 to contain a large amount of starchy matter, which was not found in explosive No. 2.

Table 6 given herewith shows results of actual analyses of explosives used by the Philadelphia & Reading Coal and Iron Co. These analyses will be referred to fully a little later on.

In drawing up this information I wish to acknowledge indebtedness to Hugh A. Wilson, explosives inspector, Philadelphia & Reading Coal and Iron Co., for information as to the uses of these dynamites.

Blasting or black powder is still being used in well-ventilated anthracite mines for bringing down coal, although this powder is gradually giving way to more modern explosives requiring less labor to do the same work. The powder used is all B powder consisting of sodium nitrate, charcoal and sulphur. No A powders or potassium nitrate powders are in use by the above named company.

An explosive of the type shown under analysis No. 1, this explosive being generally spoken of as a Judson powder, is the real competitor of black powder. This explosive is being used in blasting coal, especially in "robbing." It gives better results in coal that is partly cracked or crushed than would a dynamite quicker in action. The permissible explosives are given under analyses Nos. 3, 6, 5 and 4. Dynamites Nos. 3 and 4 are shot in small quantities in well-ventilated mines, exclusively in coal. Dynamites Nos. 6 and 5 are used in gaseous sections to bring down coal exclusively. These dynamites are shot in small quantities.

The gases from shot firing of Nos. 6 and 5 are not so strong nor poisonous as those from firing of 3 and 4. For blowing light shale and "cab" (material of slaty nature) a 30 per cent. ammonium dynamite, such as shown under analysis No. 7, is used in small quantities. For "clap on" or "mud capping" (the breaking of large pieces of coal and rock) a 40 per cent. dynamite, such as shown under analysis No. 8, is in use. This dynamite is used princi-

pally by chute starters at batteries. The gases given off are heavy and poisonous.

A 60 per cent. gelatin dynamite, such as shown under analysis No. 9, is used exclusively for tunnel work or for breaking hard rock. This gelatin dynamite withstands pretty well the action of water. It is shot in large quantities. The gases formed by firing are not so poisonous as those from the other dynamites, and this explosive is adapted for sections where it is difficult to keep up the necessary ventilation.

TABLE 6. RESULTS OF ANALYSES OF VARIOUS EXPLOSIVES

	1	2	3	4	5	6	7	8	9	10
Moisture	0.5	7.2	8.1	6.3	0.4	1.2	0.9	1.3	1.0	1.3
Nitroglycerin	19.2	23.2	24.7	25.6	9.9	10.8	15.4	39.3	49.8	36.9
Nitrocellulose	....	....	....	....	....	....	....	....	1.2	0.7
Resin	0.7	1.4	1.4	0.4	0.6	0.8	1.1	....	....	....
Sulphur	7.9	....	....	....	....	....	5.8	....	....	....
Sodium nitrate	53.8	35.7	35.3	29.5	....	....	50.3	43.2	38.0	34.7
Ammonium nitrate	....	....	....	....	67.5	78.6	18.0	....	....	20.0
Sodium chloride	....	0.6	0.7	0.7	11.0	....	....	....	1.2	2.1
Carbonates of calcium and magnesium	0.8	1.5	1.2	1.2	....	....	0.8	1.6	0.8	1.2
Zinc oxide	....	....	....	....	0.5	0.3	....	....	....	....
Starchy matter	....	none	21.7	....	....	....	0.9	....	....	....
Wood meal	....	30.4*	6.9	....	10.1	8.3	6.8	....	8.0	3.1
Wood meal and starchy matter	....	....	....	....	....	....	....	14.6	....	....
Wood meal and bituminous coal	17.1	....	....	....	....	....	....	....	....	....
Wood meal and organic matter	....	....	....	36.3	....	....	....	....	....	....
Organic nitrosubstitution product	†	....	....	....	†	....	†	....	†	†

* Contains very small amount sand or quartz. † Signifies present percentage was not determined, but is included in nitroglycerin content.

Mine Air and Gases

The subject of mine air and gases goes hand in hand with the subject of ventilation. Reference will be made here to the various gases encountered in mines, with some account of their sources and properties. The routine testing of mine air in connection with ventilation has not come into extended practice in this country.

Mine gases may be considered from two main standpoints—explosive character and physiological effects. From the standpoint of explosive airs methane is of greatest importance. This gas is more widely known as "firedamp" or "gas." It is generally encountered near the "roof" and is sometimes present in large quantities. Fortunately, methane in appreciable quantities is readily detected by means of the safety lamp. The ignition point of methane in air is given by various observers as 1,200 to 1,382 deg. F. The inflammable limits are generally accepted as 5 to 29.5 per cent. methane, the maximum explosive point being 9.46 per cent. methane. These results depend to a great extent upon such conditions as pressure, time, temperature, method of ignition, etc.

Acetylene will be found in small amounts wherever acetylene or carbide lamps are in use or where calcium carbide has been thrown out upon the floor. The Bureau of Mines' experiments have shown that "with reasonable precaution there need be little danger from explosion of acetylene in mines." The ignition point of acetylene in air is given as 896 to 1,166 deg. F., and the inflammable limits as 2.5 to 73 per cent. acetylene.

From the physiological standpoint the most important gases to be considered are carbon monoxide, carbon dioxide, oxygen and the mixed gases given off in the use of explosives.

With ordinary pressure as encountered in mines a man can breathe air with only 17.3 per cent. oxygen without any discomfort. Air containing 15 per cent. or less oxygen is breathed with more or less discomfort, the ill effects becoming more marked with decreasing oxygen content. Nitrogen is an indifferent gas physiologically. Its presence is of consequence only as representing decreased oxygen content.

Carbon dioxide is a gas always found in coal mines. Air containing 0.5 per cent. carbon dioxide is said to produce languor and headache, although no immediately noticeable effect is produced in air containing as high as 3 per cent. of this gas. Carbon dioxide in higher percentage is a poisonous gas. There are probably few or no cases, however, of poisoning from carbon dioxide, as blackdamp containing a sufficient quantity of this gas to cause trouble usually would kill from lack of oxygen. The influence of carbon dioxide is often over-estimated.

The terms carbon dioxide and blackdamp were once more or less synonymous. Black damp as we now understand it is a residual air, extinctive to flame and consisting essentially of nitrogen and carbon dioxide. The percentages of nitrogen and carbon dioxide will vary greatly, although occasionally they are found to hold fairly constant. Thus I have on a number of tests of air coming up through bore holes communicating with mine workings found blackdamp to consist of 6.59 to 7.65 per cent. carbon dioxide to 93.41 to 92.35 per cent. of nitrogen.

The term blackdamp as used by miners is rather vague. Two samples of "blackdamp" or "bad air" in mines showed, for instance, these results:

	A, per Cent.	B, per Cent.
Oxygen	14.51	4.57
Carbon dioxide	2.56	6.60
Methane	0.28	0.05

The effect of water vapor upon respiration is of much importance.

So much has been written on carbon monoxide (whitedamp) that most mining men are thoroughly familiar with its physiological effect. Carbon monoxide is an "ogygen robber." Its affinity for the blood is so great that it replaces oxygen, and the man inhaling this gas dies for want of oxygen. Two hundredths per cent. of carbon monoxide in air is the limit of toxicity. With 0.05 per cent. carbon monoxide, symptoms of poisoning are clearly observable, and this percentage in air containing only 10 per cent. of oxygen may be fatal in a few minutes. In air with normal oxygen content, 0.5 per cent. carbon monoxide will produce fatal results in a short time.

It has been said that workmen suffer and are gradually weakened by daily exposure to inhalation of small amounts of carbon monoxide. I had one experience at my home with carbon monoxide poisoning and can add my experience to those already recorded. Weakness in the lower limbs was accompanied by a sort of dazed feeling. Recovery was rapid, but headache and pain in the stomach persisted for some time.

Other gases of minor importance in mines are nitrogen dioxide, hydrogen sulphide and sulphur dioxide. All three of these gases make themselves known promptly by their pronounced odors, each one of a distinctive nature. All three gases are exceedingly poisonous and not to be breathed with safety. The first and third especially are of an irritant nature.

The gases formed in blasting in the mines are dangerous, principally because of their content of carbon

monoxide. Other gases present are of minor importance. Nitrogen dioxide, which is said to be often formed by burning of explosive or by blownout shots, is readily detected by smell, but full effects appear only some hours after inhalation. Blownout shots may possibly produce other poisonous gases, such as acrolein, prussic acid, hydrogen sulphide and nitroglycerin. The latter is sometimes volatilized without decomposition, and in such cases is said to give a sweet taste to air.

I have made a few tests of gases left at the working face immediately after blasting or shot firing and give below the composition of one such sample of air. The explosive used in this case was an ammonium nitrate powder containing about 10 per cent. of nitroglycerin.

	Per Cent.
Oxygen	15.50
Carbon dioxide	1.13
Carbon monoxide	0.24
Methane	4.17

"The only really satisfactory way to prevent injury to the miners (from gases evolved in blasting) is to have very good ventilation, and to prevent their approaching the working face until the fumes have had time to dissipate."

Inhalation of oxygen is the most effective measure of treatment of men rendered sick or unconscious from gases encountered in mines. It is said, moreover, that inhalation of oxygen prevents headache so often subsequent to poisoning.

Mine-air analysis is a valuable aid in the determination or control of underground fires. The samples of air should be taken at a place as near as practicable to the suspected fire. Some mine fires are fought by means of bore holes drilled from the surface down to the region of trouble, water and "slush" being run into the hole. In such cases air samples are taken at the top of the bore hole. Determinations of temperature at various points in a mine or at different depths down a bore hole are useful in locating fire or assuring its absence. The temperature is determined by means of a maximum registering thermometer. I have generally used maximum-minimum thermometers of the so-called Sixe's type.

Mine air containing sufficient sulphur dioxide to make its presence felt by its odor or choking effect is no doubt indicative of fire and hardly needs analysis.

Air containing even traces of carbon monoxide is suspicious; and where such air is not contaminated by gases from blasting, it must be considered as containing products of underground fire or most serious heating. No normal air from coal mines contains carbon monoxide.

The opinion has been advanced that a high carbon dioxide content in the blackdamp present in an air is indicative of the presence of products of fire, on the grounds that blackdamp from mines contains low-percentage carbon dioxide, whereas gases from fires would contain well over 10 per cent. carbon dioxide and less than 90 per cent. nitrogen when calculated to blackdamp basis. I cannot altogether agree with this opinion. In the first place it is refuted by published analyses of airs from mines, boreholes and wells. And furthermore, I have made several analyses where the air has contained over 21 per cent. carbon dioxide. Evidently, much of this gas had not been formed by the usual processes of slow combustion of coal, as such a product could contain no more than 20.93 per cent. carbon dioxide at a maximum.

This carbon dioxide had most certainly been formed by the action of acid mine water upon carbonate rock formations. A number of air samples taken from points where fire had been in progress showed less than 9 per cent. of carbon dioxide in the blackdamp present, and these airs all contained carbon monoxide. Hence, there is too much uncertainty in depending upon the carbon dioxide content of blackdamp as an index of possible fire.

Rescue Apparatus

The question of artificial breathing apparatus, or "rescue apparatus," is naturally closely associated with the matter of mine air and gases. It is for this reason, no doubt, that many of the coal companies have placed the chemist in charge of rescue apparatus. Moreover, the operation of such apparatus is based directly on fundamental chemical principles. A chemist is able also to supplement the ordinary work of the rescue-apparatus department by analyses of the oxygen used in the apparatus.

A great deal has recently been written relative to rescue apparatus, and the scope of the present paper will not permit the taking up of this question. I wish, however, simply to mention one or two points. Rescue apparatus can be very useful in other ways than in connection with mine fires or explosions. Repair work in bad atmospheres and the taking of samples of air after shot firing are two uses to which the Philadelphia & Reading Coal and Iron Co. has put its apparatus. Especial attention is called to the necessity of having rescue apparatus air-tight and absolutely free from leaks. All apparatus should be inspected frequently and carefully by one who makes a specialty of such work.

Treatment of Timber

One of the necessary materials in the operation of coal mines is timber, and the services of a chemist are useful in the preservation of this material. It has been conclusively proved that mine timber properly treated far outlasts ordinary or untreated timber, but although this is general knowledge, yet at the present time only a comparatively small percentage of treated timber is used in anthracite mines.

A number of chemicals may be employed for preserving timber. Probably the most widely used materials are coal-tar, creosote and zinc chloride. I will not go into the question of inflammability of treated or untreated timber, but will only say that there has always been in the minds of many mining officials the fear that the use of creosote might add to the fire danger in mining. Moreover, the use of a 3 to 4 per cent. solution of zinc chloride has proved much more economical, and it has been the practice for a number of years at the mines with which I am connected to preserve timber with zinc chloride.

In purchasing zinc chloride it is well to specify that this material shall show no free acid when tested with methyl orange indicator; that is, the material should be slightly basic in nature. Such a basic zinc chloride will not prove so corrosive to the tank in which it is used.

Owing to the scarcity of creosote and to the high price of zinc salts resulting from the present unusual conditions, due to the European War situation, a great impetus has been given to the use of sodium fluoride in preserving mine timber. Sodium fluoride is a white powder that dissolves in water, but not nearly so readily as does zinc chloride.

The sodium fluoride is dissolved in water to form a solution of about 3 per cent. strength, and the treatment

of the wood is carried out in just the same manner as is the case with zinc chloride or creosote. Under present market conditions the cost of this treatment is less than that of a creosote treatment and slightly more than a zinc chloride treatment.

Sodium fluoride has not been used largely in the past, but data on hand would lead one to expect promising results from its use. Not being so soluble in water as is zinc chloride, it is less liable to leaching out. It is less corrosive in nature than is zinc chloride. It is only slightly poisonous, but its antiseptic properties are much superior to those of zinc chloride.

A series of tests made in this country relative to the fireproofing of wood would show that sodium fluoride is one of the most efficient materials available for this purpose, and as its injection into the mine timbers does not result in any appreciable weakening of these timbers, sodium fluoride should prove an ideal wood preservative for mine use. Five analyses of sodium fluoride are given below; Nos. 1, 2 and 3 represent shipments actually used for treating mine timbers, while Nos. 4 and 5 represent samples sent to the writer for his opinion.

	1, %	2, %	3, %	4, %	5, %
Moisture	0.5	0.4	2.2	0.2	none
Insoluble matter	0.5	1.1	0.3	0.1	2.0
Sodium silicate	2.3	1.2	2.3	...	0.9
Sodium carbonate	0.6	...	2.4	...	1.0
Sodium sulphate	trace	2.2	4.0	small amt.	trace
Sodium chloride	trace	...	...	small amt.	0.5
Sodium fluoride	92.3	93.8	88.6	91.8	95.4
Free hydrofluoric acid	none	0.2	none	6.6	none

A suitable specification on which to purchase sodium fluoride is as follows: The material should contain at least 94 per cent. actual sodium fluoride; other salts not to exceed 5 per cent.; matter insoluble in water not to exceed 0.5 per cent.; and sodium carbonate not over 1 per cent.; the material should be free from acid and contain as little water as possible.

Can Timber Waste Be Utilized?

The use of timber and wood in general about the mines brings the chemist face to face with the great problem of utilization of waste wood. One single colliery or mine may average, roughly speaking, a cord of waste wood per day, consisting of about 80 per cent. oak and other hardwoods and 20 per cent. yellow pine, hemlock, etc. The Forest Service states: "There have been practically no processes developed for the inexpensive operation of small units. About the smallest hardwood distillation plant that can be operated profitably is about 10 cords per day capacity, but a plant of this kind would cost very nearly $25,000 for installation."

The matter of assembling at one point all the wood waste available would result in excessive freight charges; so that while waste-wood utilization can be made commercially profitable on a large scale, yet the matter of utilization of smaller amounts of this waste still remains a problem for the chemist to solve. Cement and steel are being used to a limited extent to replace mine timbers.

Another material of a combustible nature which has a large and important use underground is brattice cloth. Some mines can make successful use of the so-called non-inflammable jute cloth. For the anthracite mines of the Eastern field these jute cloths are not strong enough to stand the wear and tear due to the cutting action of the coal. The best material for brattice cloth at present available would seem to be a fireproof cotton duck.

In mines where it has been customary to use the ordinary plain No. 8 cotton duck a No. 10 cotton duck thoroughly fireproofed will give approximately equal service and at the same time greatly reduce the fire danger. Various materials have been used for fireproofing cotton duck, such as magnesium chloride, calcium chloride and ammonium sulphate. The cloth showing best results for the writer answered tests for calcium and magnesium oxide and sulphuric anhydride. A cloth impregnated with alum was found to be somewhat inferior in fireproof qualities.

Coal-Mine Illumination

There is much room for improvement in the oils burned in miners' open lamps. A multitude of various grades of oil is being used. The Philadelphia & Reading Coal and Iron Co. has been using an oil compounded from 50 per cent. fish oil and 50 per cent. paraffin oil. This illuminant is comparatively slow burning and hence economical, but it gives off much smoke and has a rather offensive odor. "Miner's Sunshine," a grade of paraffin, is an excellent material for use in poorly ventilated sections of mines. This material is supplied in small cakes and is used in special lamps constructed, in part, of copper in order to keep the paraffin in a liquid state.

Oil lamps are, however, rapidly giving way to carbide or acetylene lamps. There are a number of satisfactory miners' carbide lamps. Theoretically a lamp with a "safety" gas outlet (through stem) is preferable. The elimination of the felt filter in carbide lamps is suggested as an improvement. The best grade of calcium carbide—that is, that giving the highest yield of acetylene gas—is the most economical and most satisfactory grade for the miner to use.

The use of calcium carbide gives waste residue. The chemist is sometimes called upon to utilize this material. Samples that I have collected have shown an average composition of approximately 79 per cent. hydrated lime, 13 per cent. carbonate of lime, 8 per cent. insoluble matter. This carbide residue could, if considered worth while, be collected and spread out in the air for drying; being practically a finely divided hydrated or water-slaked lime, it might be used as a dressing for acid soils, as a whitewash or disinfectant for outhouses, for making mortar or for neutralizing acid in mine waters.

There are many types of satisfactory safety lamps. The anthracite coal region would seem to be a stronghold of the Davy safety lamp. Sperm oil is the most satisfactory illuminant to use in this lamp. I have examined a number of oils, and none seem to equal sperm oil, with the exception of peanut oil.

The designing of a wick for the Davy lamp which would permit the satisfactory and economical burning of ordinary 300 deg. fire-test petroleum oil would result in the saving of thousands of dollars. Safety lamps other than the Davy are employed to less extent in the anthracite fields, and their use, especially as working lamps, is to be encouraged. Lamps with air vents below the wick are more satisfactory than lamps of the ordinary Clanny type. In lamps burning naphtha a pyro-igniter is not only safer, but much more convenient and economical than paraffin friction matches.

There is a great difference in the quality of lamp glasses supplied by different dealers. A good test of lamp glasses consists in immersing them in cylinder oil heated to various temperatures and plunging the heated glasses into ice water. The oil is heated to temperatures of 200 deg. F., 250 deg. F., 300 deg. F. and so on up, 50 deg. at

a time, until the lamp glass when immersed in water cracks.

The acetylene safety lamp is almost a stranger in the anthracite field; in its present form it is not to be recommended. The chemist has helped in the development of the electric safety lamp for miners, although the great part of this work has been accomplished by electrical engineers. The chemist is often called upon for aid in the preparation or examination of electrolyte used in lamp batteries and is, moreover, occasionally consulted for advice on various points pertaining to such batteries.

Miscellaneous Activities of Coal-Mine Chemist

There are quite a number of additional ways in which a chemist may make himself useful at coal mines, but the space allotted to this paper does not permit a detailed discussion of these matters.

The testing and selection of metals or alloys capable of resisting the acid of mine waters are essentially chemical problems, as is likewise the selection of paints or protective coatings for iron pipes or other metalwork exposed to mine water. The life of iron pipes for mines can be greatly increased by the application of a suitable protective coating, either by dipping or by painting. Asphaltic preparations are far superior to preparations consisting essentially of coal-tar products.

There exists some difference of opinion as to the action of mine water upon concrete. My investigations would indicate that while concrete will sometimes fail when exposed to the action of mine water, yet, as a rule, concrete structures well made will prove quite satisfactory. The use of mine water in the mixing of cement or concrete does not seem to have any appreciable effect upon the strength or durability of the product. The use of slate as an aggregate in concrete, while not to be recommended generally, has proved, nevertheless, satisfactory in some cases.

The chemist is concerned with the lubrication of various machinery used underground, such as car journals, wire ropes and pump plungers. A pump-plunger grease should not be dependent for its consistency or body upon its metallic soap content. The best grease for pump plungers would be a waterproof grease not appreciably affected by the action of dilute acid.

The testing of rubber goods and, in general, all of the miscellaneous supplies used underground is a matter for chemical supervision. The investigations of explosions or mine accidents is not complete without the opinion of a chemist, and there are many problems not of a strictly chemical nature which can advisably be referred to the scientifically trained chemist.

Working an 18-In. Seam in Northern France

By Gaston Libiez*

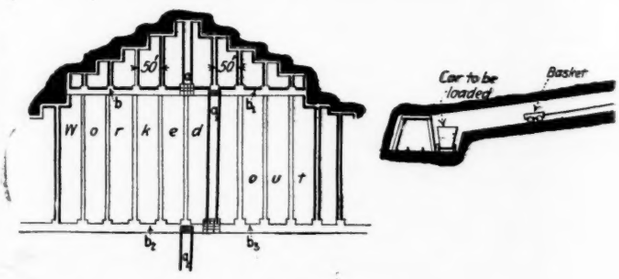
Formerly the working of thin seams was very costly, because of the enormous amount of rock that it was necessary to remove. When the seam was steep, the ordinary methods with sheet-iron troughs was sufficient, but I will try to explain how a thin seam of coal in northern France was worked in an economical manner by the step longwall system.

*Peru, Ill.

This seam averaged from 14 to 20 in. in thickness, overlaid with a good roof and a shale bottom. The dip, or pitch, was not sufficient to allow the coal to gravitate. Instead of driving headings and brushing down the roof to make height, small rooms were turned off the strike entry every 50 ft. The entry was driven 6 ft. high, the bottom was lifted to make height, and for each room to be turned a shoot was fired in the rib to allow room for a car.

To extract the coal the miner took advantage of the pressure, the coal being practically always loose. The bottom was lifted only to get material to build good packs on each side and to secure a height of 47 in. on the pitch rooms. The rooms were only 72 in. wide between timbers and were driven up 250 ft. long.

To load the coal a basket on flangeless wheels was used, and for the purpose rails were put flat and spiked to small ties notched properly to fit the side of the



PART PLAN OF THE MINE AND SECTION OF A ROOM AND HEADING

rails. The basket, when loaded, was lowered with a small hemp rope snubbed around a prop. Three basketfuls were needed to fill a car. When the seam thickened up two baskets were enough, and when it thinned out, a smaller basket was employed, making four trips to fill a car. The basket was built of strong willow reinforced with steel.

There were but few roads needing brushing. The roads on the strike were cut off every 500 ft. by a self-acting incline to lower the cars. The inclines were driven up the same distance as the rooms, instead of continuously as was formerly done, and a new incline was started from the first room, as may be seen in the accompanying drawing.

Five miners working a room were able to make 25 to 30 cars of coal, a helper doing the loading. The cars were pushed by boys to a parting close to the incline, one boy being necessary for two or sometimes three rooms. Two boys were needed to lower the cars on each incline. The main inclines below lowered four cars per trip instead of two, as was done above. The cars were of steel of ¾-ton capacity, with a track gage of 24 in.

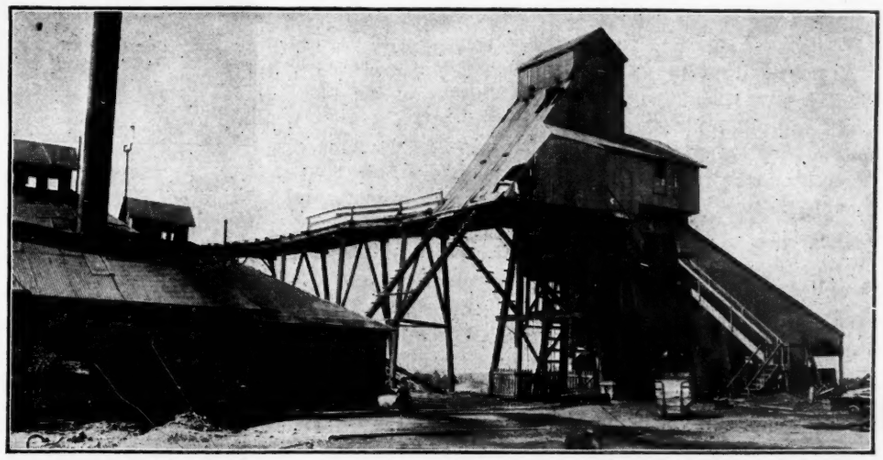
The boys were paid from 40 to 60c. for a 9-hr. shift (this was 16 years ago). Loaders got from 60 to 70c., and miners were paid by the square meter, the price varying from 14 to 18c. Often the loader was a young apprentice. In such a case the miners had to pay him. The method of operation here described is somewhat similar to the scraper method sometimes employed in American mines. It was decidedly at variance with general practice as followed in this country but was advantageous under the conditions existing.

Quenching a Fire in a Kansas Mine with Chemicals*

By John Pellegrino†

On Feb. 11, 1916, I was notified by Holmes Wager, cashier of the Western Coal and Mining Co., of Pittsburg, Kan., that some men employed by that company had discovered a fire in mine No. 14, located near Fleming. The great amount of smoke caused by the fire, he said, made it impossible for the men to go to work. Mr. Wager requested me to get some mine-rescue apparatus and fire extinguishers and come to help extinguish the fire.

I advised John L. Boardman, foreman of mine-rescue car No. 4 of the United States Bureau of Mines, that No. 14 mine was on fire and, procuring an automobile, drove to the mine-rescue station, taking five sets of Westphalia rescue apparatus, with an extra supply of oxygen and potash cans. We caught an interurban car for the mine, arriving there at about 11:30 a.m. and at once got ready to go into the mine. The fire-fighting squad was composed of the following men: John L. Boardman, of the United States Bureau of Mines; James Sherwood, deputy mine inspector; Phil Rooser, superintendent; George Price, mine foreman; Ed and William Caldwell, Ollie Welcome, Thomas Mauterer and Arthur Davis, employees at the mine, and myself. The mine foreman notified us that the fire was in the 8th north back entry on the east side of the mine. In traveling from the parting to the entrance of the 8th north we encountered much smoke. When we got to that entry, we were compelled to use the mine-rescue apparatus to make progress along it because the smoke was too thick for unequipped men.



MINE NO. 14 OF THE WESTERN COAL AND MINING CO.

The fire was found in the back entry off 8th north, in the working face of the entry and was apparently caused by a shot that had been fired by the shotfirer the night before. The heat produced by this amount of burning coal confined in a small space was extremely hard to face. There were two loaded cars standing on the entry about 15 ft. from the fire, so that we had to crawl over them to reach the burning material.

We got to the fire about 12:30 a.m. It had apparently been burning since the shotfirers left the mine the night before, some 18 hr. previous. After so great a lapse of time the fire had made such progress that it was hard to extinguish.

The flames were about 3 ft. high when Mr. Boardman emptied the first Pyrene gun on the blaze. He unloaded part of two other guns of Pyrene on the embers, and it cut the flame out altogether and cooled off the fire. We then retired to the main entry, back of the door, where we could get some fresh air, as the smoke and fumes from the extinguisher mixed and made dense smoke in the entry.

We had exhausted our stock of Pyrene and had to wait until we got more. At about 2:30 we got two quarts more and some red tin-can fire extinguishers. Another attempt was made to reach and extinguish the fire by John L. Boardman, James Sherwood, Frank Price and Thomas Mauterer.

Fire Is First Subdued Without Use of Water

They emptied two more guns of Pyrene, and it cooled the fire to such an extent that when Mr. Boardman was putting on the red tin-can extinguisher, he dropped one can in the fire and picked it out of the pile without burning his hands.

We saw that there was not enough Pyrene on hand to extinguish the fire, so I left at half past four and went to Pittsburg and got ten quarts more, which I sent out to the mine by Charles Paisley, the deputy mine inspector. During the time that I was away the squad fighting the fire procured two water cars and a double-action hand pump. After cleaning up a fall, they pushed the two loaded cars into a room so they could get closer to the fire with the water cars as they desired to fight it with hose. But as soon as Deputy Inspector Paisley arrived at the mine with the Pyrene they used three quarts more of that.

They then fell back for some time to let the Pyrene work on the fire. A short time later they emptied three quarts more on the embers, and this cooled the heat and flame to such a degree so that when the water was used, the mass was so much cooled that it did not make much steam. At about 10 o'clock there was no smoke in the entry, and the coal did not generate steam when water was thrown on it.

This method of extinguishing fire is better than playing water on it in the first instance, as it puts out the flames and reduces the heat to such an extent that the coal will not make nearly as much steam as when it is struck by water. Thus working conditions are much safer. Steam causes the rock to fall, and a fatal accident may result from a roof fall. That the fire was severe can be realized when I state that it had been burning at least 18 hr. before we arrived, and that it took us 12 hr. to extinguish it. It is easy to imagine how much heat and smoke there was in the face of that entry.

It was impossible to get trained rescuemen, as there was no team at that mine. The mine foreman was only

*Report made to P. J. McBride, commissioner of labor and industry, State of Kansas.

†Assistant commissioner, State of Kansas, Pittsburg, Kan.

partly trained, and we had to take the following men who had never been taught mine-rescue work: Ed and William Caldwell, Ollie Welcome, Tom Mauterer, and Arthur Davis. These men certainly used the apparatus to great advantage and performed their duty like veteran rescuemen. John L. Boardman, of the United States Bureau of Mines, showed that he was well qualified for any emergency.

The horseback in the face of the entry was baked by the heat of the fire, and the roof of the entry was affected for a distance of 177 ft. back from the face. There was so much heat in the fire that, had water been used first, many men would have been scalded. By using the extinguisher first and water afterward this danger was avoided.

Ruin Wrought by a Law Suit

By W. E. Joyce*

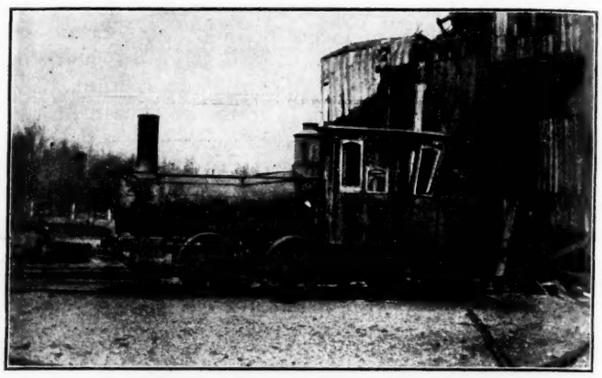
A recent decision by Judge Moser in the Luzerne County courts has again directed attention to the Pond Creek mining property situated on the extreme eastern end of the Lehigh coal field. It has revived activity there by the award of a contract to reopen the slope, though the legal difficulties of permitting complete and harmonious operation have not been entirely removed.

An idea of what litigation can do to a mining property is well conveyed by the accompanying photographs. The decayed remains of a plant which once involved an investment of $100,000 is a pointed commentary on human weakness. The locomotive whose remains are seen at the foot of the breaker was once part of the active rolling-stock equipment on the New York elevated lines. The legal tangle has curtailed its usefulness and prevented even the scrap gatherers from converting it into, say, shrapnel. Thirteen years of idleness and unsympathetic weather elements show wear and tear to better advantage than any system of bookkeeping experts could evolve.

This has happened to a property in the Lehigh coal field that at one time gave promise of establishing an important industrial center. A town was built, stores were opened, railroads were extended to haul the product, and a post office was established. Through the persistency of litigants the post office alone remains.

Three tracts are directly involved, known as the Cooper, Hemsath and Brandmeier, embracing some 400 acres. Adjoining these but not involved in the present litigation are the Fairchild and Sherman tracts, through which the coal seams extend all the way west to Sandy Run, operated by Kemmerer & Co., and northwest to the No. 6 operation of G. B. Markle & Co. and that of the Upper Lehigh Coal Co.

The three last-named companies have been making coal shipments of over 400,000 tons annually during the past 13 years, while at Pond Creek nothing has been done except for a short time, when Madeira, Hill &



THIS WAS ONCE A FINE LOCOMOTIVE

Co. managed to effect a partial truce and reopened one old slope. Meanwhile whatever improvements were made in early days to the property are going to decay, and with them are passing the lives of the coal-land owners who might be contributing considerable to the industrial development of the state. A one-time happy and beautiful mining village is deserted, and the hundred homes for the most part are given over to the ravages of time. And all this started over a matter of $3,200.

The first man to open the mines was William Zehner, whose name the government authorities have given the post office. Zehner built a breaker and developed the underground workings, but an inrush of water drowned out the slope and he relinquished the lease to M. S. Kemmerer & Co., who continued mining from 1883 to 1890. This firm hauled the coal for preparation to the Sandy Run breaker. A question of royalty caused Kemmerer & Co. to give up the lease, and the property was later taken over by the Wyoming & Pond Creek Coal Co. This company opened a new shaft and slope near the eastern end of the property, erected a new breaker and expended considerable money in improvements and equipment. Things went awry with the company in a business way, and in 1897 a receiver was

THE REMAINS OF THE POWER PLANT

WHAT IS LEFT OF THE TIPPLE

*Sandy Run, Penn.

appointed. This seems to have marked the beginning of lawsuits which have continued ever since, but which now appear to be giving promise of settlement.

After the receiver took charge of the property, W. G. Thomas, of Pittston, secured a new lease for $2,240. Work at the mines was then resumed. Madeira, Hill & Co. became interested, taking over the entire plant which, with improvements and equipment, involved an outlay of about $100,000.

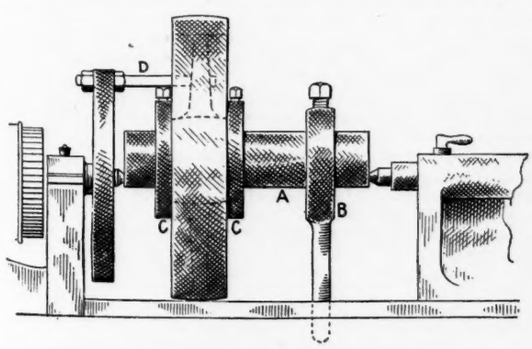
In the meantime Ludwig Brandmeier, agent for the mining interests of the Hemsath and Brandmeier estates, died. Negotiations for a new lease were opened by the heirs. A claim of $3,200 as balance due on royalties from the old company was presented to Mr. Thomas by the heirs. Claiming that his firm had not assumed the old concern's debts, he denied the justice of the claim. From this began a suit at law which has passed through the lower courts of Luzerne County three times and has once been in the Supreme Court. Settlement now hangs on a verdict recently given by Judge Moser for $8,000 in favor of the heirs, and a guarantee of placing the breaker in as good condition as when the suit began.

A year ago a wind storm carried away upper portions of the breaker, and dismantled the boiler house and shops. It is estimated that $35,000 will scarcely make renewals.

That the litigants have not yet agreed to quietly accept the last court decision was shown recently, when the sheriff was called upon to stop the work of removing the surface rails from the property. Meanwhile Fred Brandmeier, one of the heirs, has set up a small engine near the breaker and begun preliminary work on reopening the slope, which is now down to the first lift gangways, all of which are caved.

Turning a Large Pulley

The illustration shows a way to turn a pulley larger than the capacity of a lathe. The pulley is first bored and reamed. Then a piece of shafting *A* is made a nice running fit, the pulley turning on the shaft, which is



TURNING A LARGE PULLEY

held stationary by the cam *B*. The collars *C* hold it in place.

A stud *D*, fastened to the faceplate, drives the pulley. It is obvious that the pulley will run faster as the stud is coming up and slower as it is going down. The stud should be so placed that the tool is taking the high spots when the stud is nearing the bottom center.—W. D. Dawson in *American Machinist*.

Extracts from a Superintendent's Diary

During the past few years members of labor unions everywhere have been rather outspoken as to their dislike for state military organizations in general, and they seem to have the same dislike for the particular organizations that have been formed within their respective states, regardless of the type of men who have enrolled. If this opposition was confined to states where military bodies have been used to sober down strikers thirsting for trouble, one could at least understand how such sentiment might get started; but since it is not confined to those states, reasonable justification for such sentiment is hard to find.

I have discussed this peculiar state of affairs with numbers of my men as opportunity presented itself, and I have yet to find a single one willing to shed any light on the mystery. One man informed me that he had a "hunch" that after a man got to be a soldier he would not care to be classed as a laborer again, and so he was opposed to any laboring man's joining the militia. He told it in all seriousness and may have believed what he said. That is the nearest I have come to getting an answer.

Of course, I have my own opinion in the matter, but opinions are poor bedfellows until they have been confirmed.

Today I received some literature from our representative in Congress, from which it is evident that he has gone crazy on the subject of preparedness, and I am wondering how he will be able to square matters with his miner friends. Heretofore he has always been able to make explanations when called to account by any of his constituents, but defending a preparedness program before a crowd of people who are "agin" anything that smacks of military organization and training will be interesting, to say the least.

It is possible that the present agitation for preparedness will change the sentiment of the union advocates toward military organizations, since that sentiment was largely formed before the present war was dreamed of and before such words as "pacifists" and "universal service" became as familiar as "bread" and "potatoes." However, so far as my observations go, there is no evidence of such a change of heart as yet.

Several of our foreign-born workers have been "called to the colors" and have merrily sailed away to fight for their native country and king, but our men look upon them as unfortunate victims of fate and lose interest in their departure before they have a chance to realize what military training and military loyalty have had to do with the matter. When they think of Europe at all, they think of it as a place where the Socialists are awaiting an opportunity to get into the saddle.

I am looking forward with a great deal of interest to the next visit of our congressman, because if my conclusions are correct, we will be treated to some impromptu debates in which both parties to the argument will try their best to withhold their views and yet endeavor to make plausible statements. Possibly some of our fellows, while in the midst of the arguments, may happen to refer to the men who have gone to join their colors, and then unconsciously they may say things they really mean; if that happens, our representative may find courage to give them something to think about.

The Labor Situation

General Labor Review

The anthracite region has at present only a few strikes, and those sporadic. The Pittsburgh region proper has none, but in the Allegheny River field there are many strikes for union recognition. It is likely that they will be successful. In the Somerset County field there is also unrest, but here it is not so likely that the union will win.

In Ohio there is trouble about the price of powder in the Hocking Valley district, and as a result an extensive strike is threatened. In West Virginia the mine foreman and firebosses have formed a union of their own, and the United Mine Workers have suspended and fined a local union for going on strike in violation of the rules of the union and the contract with the operators.

In the Southwest the miners are seeking several important modifications of the former biennial contract. These changes involve privileges that do not appear in the terms of the McAlpin agreement or in the declaration of fundamental changes recently signed. The operators are making a strenuous resistance.

The situation in Wyoming, where a contract is being made, appears to be clearing; but in Michigan the mine workers have presented an ultimatum to the operators declaring that the latter have violated their contract with the mine workers in three particulars.

To Dismiss Most Cases Against Mine Workers

In Colorado Attorney General Farrar has requested that 43 indictments against Las Animas mine workers, accused of violence during the strike in the southern Colorado coal fields, be dismissed. In all 97 defendants have been freed of charges by the attorney general's office. There are still 33 Huerfano County cases to be considered by the attorney. All the indictments in Fremont County have already been dismissed. It is said the cases are being dropped partly for lack of money to meet the cost of prosecution and partly for lack of evidence.

The three indictments for murder against John R. Lawson are not included in the dismissals requested. A charge of murder still rests against James T. Davidson, and there are three indictments for murder against two others.

John H. Walker, of Danville, Ill., is seeking election as president of the United Mine Workers of America. John P. White's candidacy for reëlection was announced on Aug. 11 by Frank J. Hayes, the present vice-president, who also is desirous of succeeding himself. In this ambition he is opposed by William Green, of Coshocton, Ohio. Nominations do not close till 60 days before Dec. 12, when the annual meeting of the organization occurs.

Anthracite Troubles Decrease

The "button strikes" having been successful, most of the anthracite collieries are now working as if nothing had happened to disturb their peace. The Eagle Hill and Silver Creek collieries of the Philadelphia & Reading Coal and Iron Co. have gone back to work, as the miners who were in arrears in their payments to the union paid up their dues and were reinstated.

The boys at the breaker of the Evans Colliery Co., Beaver Meadows, Penn., near Hazleton, went on strike recently to enforce their privilege of being allowed to bathe in the reservoir that supplies water to the boilers. The superintendent has prohibited the use of the reservoir because the mud was kept constantly stirred up, and the feed water supplied to the boilers was thereby rendered unfit for that purpose.

The contract miners of W. R. McTurk Coal Co., at the Girard mine, Girardville, Penn., near Shenandoah, have gone on strike, making 1,000 men and boys idle. The men complain that the company would not allow them to quit after they had prepared enough coal for their laborers to load during the 8 hr. (But why not turn in and help the laborers?)

It is needless to say these strikes are violations of the miners' agreements. All strikes in the anthracite region are such violations. If a capitalist broke his agreement as these mine workers do, he would be bankrupted by the damages which the courts would compel him to pay.

Union in the Keystone State

Last week "Coal Age" called attention to the formation of new combinations of mine operators in the Allegheny district, which included the Ford Collieries Co., of Curtisville, the Bessemer Coal and Coke Co., of Russellton, the Allegheny Coal Co., of Harwick, and the Kinloch Coal and Coke Co., of Arnold.

Under this agreement firemen who got 25c. per hr. now get 33c.; pick miners have been given a rate of 56c. a ton instead of 49c. as formerly granted. Double-shift entrymen now get 53c. a yard instead of 41c. as formerly. Loaders are advanced from 33½c. a ton to 35c. and shotfirers from $2.80 per day to $3. Pumpers formerly received 25c. an hour. The rate is now raised to 35c. Common laborers who used to receive $2.75 per day now are paid $2.80, while dumpers whose wages were $2.18 per day are now paid $2.35 to $2.42. All men are paid by the hour and work 8 hr. The company agrees to collect 50c. monthly from every man as union dues and turn the money over to the organization.

Miners Hope To Complete Another Contract

The union is hoping soon to form and make a contract with another even smaller combination of operators, which will include the McFetridge Bros., the Cornell Coal Co. and the Creighton Coal Co. This will leave only the Kiskiminetas group, which is regarded as the most irreconcilable of irreconcilables by the union men.

In the issue of Aug. 5 "Coal Age" called attention to the settlement of the union with the Victor Coal Mining Co. in Somerset County and incidentally declared that the company had granted the demands of the union and put on a checkweighman. The company, in a written statement, declares that this information is incorrect and that the men withdrew their demand for a checkweighman and returned to work. They objected to the weighboss at No. 1 mine, but were satisfied with the weighman at No. 3. The company agreed to put on a weighboss at No. 1 mine who would suit both the miners and the company. This was done accordingly.

Strike Is Likely to Fail in Somerset County

The miners of J. O. Ream, in the southern part of the county, who for some time have been on strike for a recognition of the union, have returned to work without that concession. The Hocking Coal Co.'s mine at Garrett and the Pretoria mine of J. B. Kennerly, at Hollsopple, are still on strike for union recognition.

The Knickerbocker Smokeless Coal Co. and Baker-Whiteley Coal Co. are still making progress and increasing the outputs of their mines in spite of the determined efforts of the United Mine Workers to interfere, the former company now producing about 500 tons per day and the latter 200 tons.

On Tuesday, Aug. 8, the sheriff served injunction papers on about 200 officials and members of the United Mine Workers of America at Hooversville, where these operations are located, restraining the mine workers and others from intimidating or interfering with the miners now working. The question whether this injunction shall be made permanent was brought before the court at Somerset, on Aug. 12. Van Bittner, ex-president of Pittsburgh district No. 5 of the United Mine Workers of America, has been sent into the field to assist in organizing the mine workers.

West Virginia Union Suspended

The union leaders in West Virginia are trying to prove their loyalty to the agreements they have signed. The members of local union No. 1931, at Donwood, Kanawha County, on the New River, who were employed at two mines of the Eureka Coal Co., recently stopped work because the management would not pay the two motor helpers at the same rate as it did the motorman. The union posted the following notice:

This is to certify that local union No. 1931, located at Donwood, on Morris Creek, is suspended from all the rights and privileges of the United Mine Workers of America and each member is fined $10 for insubordination. This local is on a strike in violation of section 10, article XX, International

Constitution, and in violation of the Kanawha agreement, and refuses to be governed by the laws of the United Mine Workers of America.

After repeated efforts on the part of the district officials to get the members of the local to work and have their grievances taken up in the regular way, they have refused to do so. Therefore we are notifying and instructing all local unions to refuse any transfer cards from local union No. 1931 and to charge any person holding a card from that local or who is known to have worked at Donwood and joined in the present strike, the regular initiation fee of $10 and also to collect the fine of $10 for the district, before allowing him any rights or privileges in the United Mine Workers of America.

Any man or men belonging to the United Mine Workers of America must comply with the laws of our organization and observe its contracts. The United Mine Workers of America is a business organization with integrity to uphold, and its contracts must be observed by its members.

A West Virginia Organization

The Brotherhood of Mine Foremen and Fire Bosses of the State of West Virginia, with headquarters in Montgomery County, was issued a charter of incorporation on Aug. 7. The purpose of the organization is declared to be "to aid its members to become more skillful and efficient workers, the promotion of their general intelligence, the elevation of their characters, the regulation of their wages and their hours and conditions of labor, the protection of their individual rights in the prosecution of their trade or trades, or for such other object or objects, for which working people may lawfully combine, having in view their mutual protection and benefit."

The incorporators are Lee Jenkins, Carbondale; W. H. Thompson, Cannelton; A. J. Jenkins, Carbondale; John Porter, Cannelton; Frank Selbe, Cannelton; R. M. McSurley, Montgomery; Thomas Griffiths, Montgomery, and Tom Cunningham, Cannelton.

It will be seen that the incorporators are from the Kanawha district, and it is purposed to enroll as far as possible all the mine foremen in the Kanawha coal fields.

It is certain that mine foremen are entitled to more consideration than they have received in the past. Long hours, heavy responsibility, not a little study, uncertain tenure of office and frequent flittings make their jobs quite unsatisfactory. Yet they are not paid as well as the miners they are bossing and do not have nearly as much liberty.

Frequently in the bituminous mines they fail to get any increase when the mine workers receive their advances. In a world that is unionized hardly anyone can stay out and keep up with the procession in the matter of working conditions and wage rates. Nothing proves this more surely than the declining status of the mine foreman despite the growing importance of his work and the increase in his fitness to fill his position.

Demand More Pay for Powder

The McAlpin agreement clearly requires that no change shall be made in any contract whereby the earning power of the miners shall be diminished. In consequence, all contracts made under that agreement, except the unfortunate one at Pittsburgh, either arrange for a continuance of the old powder rate or say nothing about it.

The Hocking Valley contract does not specifically mention powder, but it must be interpreted of course in terms of the McAlpin agreement, on which it is based. Moreover it states specifically:

34. Conditions governing all employees in and about the mines during the years 1914 and 1915 and not specifically covered in the above rules and conditions shall remain unchanged.

The argument of the miners for unchanged powder prices is quite strong. The leading defense the Hocking Valley operators have in changing it is that as Pittsburgh has been allowed to invalidate the provision in clause 6 of the McAlpin agreement or, to put it the operators' way, as the price of powder has been regarded as not being referred to in that clause, the Hocking Valley should not maintain the invalidated provision or put upon it any more comprehensive meaning than has the Pittsburgh region. But if this is a good argument, Indiana and Illinois might advance it to excuse an increase in their powder rates.

Powder Rate Is Raised from $1.65 to $1.90

As a result of the powder rate being raised from $1.65 to $1.90 per keg, Sanford Snyder, president of the subdistrict union, called out the men and 1,500 miners went on strike.

The operators claim that they do not have to sell powder to the miners and that if the miners do not like the prices of powder they can buy elsewhere; in short, that the sale of explosives to the miners was a merchandising act of the company which had no organic relation to their coal business and could be dropped whenever the companies were so disposed.

The companies concerned are the New Pittsburgh Coal Co., the New York Coal Co. and the Poston Consolidated Coal Co. The mines are located at Athens, Nelsonville, Murray City, Canaanville and Millfield.

The state union officials, including State President John Moore, have very properly taken immediate action to compel the men to return to work and let the controversy be adjusted as the contract demands. A meeting of mine operators and union officials was held at Columbus to discuss the powder rates on Aug. 14, but without result. The men are now working, but should it be found impossible to bring the operators to time, a strike is threatened. In this case 8,000 men may be involved.

While the action of the operators cannot be approved, it is far more justifiable than that of the companies in the Pittsburgh region. In that district, some of the items, the rate on which was changed in the subsidiary agreement, had already been matters of written contract and therefore the supplying of those articles at a fair price was regarded as part of the conditions of employment. Moreover, these items have not changed in price nearly so much as powder.

There is room just at present for 4,000 more miners in eastern Ohio, according to C. J. Albasin, the president of that subdistrict. Governor Willis has announced the names of the delegates who are to take part in the conference on mining legislation at the Hotel La Salle, Chicago, on Nov. 13. They are as follows: John Moore, Columbus, president Ohio United Mine Workers; Percy Tetlow, Washingtonville; James Pritchard, Columbus, state mine inspector; Walter R. Woodford, Cleveland, and Dr. T. R. Biddle, Athens.

Michigan Affairs Are Acute

The mine workers in Michigan have served an ultimatum on the operators of that district (No. 24), according to John Crutchfield, the president of the district. They have three complaints to make: (1) That at the Chappell and Fordney mine the operators cleaned the coal of impurities before weighing it, this being a violation of the agreement. The mine has been closed for three weeks because of this dispute. (2) That the minimum day-wage clause was not obeyed at the Black Diamond mine in Bay County. (3) That excessive charges for miners' necessities are being made at all mines, and in particular for explosives.

Big Strike in Kentucky To End

On Wednesday, Aug. 9, the representatives of the United Mine Workers of America in western Kentucky tentatively accepted the offer of the operators. The vote was 31 to 18 in favor of the compromise. The men have been idle since the last of May.

The miners are to go back to work and the differences between the parties are to be arbitrated within 30 days, two arbitrators being appointed by each side. If they cannot agree, the four arbitrators will select a fifth. The matters to be discussed and adjudicated are the prices for shortwall machines and for deadwork about the mines.

The miners concede that two men be assigned to three rooms, instead of each man having two rooms in which to work. But the operators agree to allow the men to select their own buddies, and also not to crowd the mines for the purpose of enlarging the store business or increasing the rent receipts. The risk of their seeking either of these ends just now is remote, as the exodus from western Kentucky has made the mines quite short-handed. Moreover, the present brisk market will give the men all the work they want to do.

As was shown at the Central City meeting, there is much bad feeling among the leaders in District 23 because the international organization has not supported the west Kentucky strike. President W. D. Duncan, who presided at the convention, refused to recognize W. O. Smith, the international organizer, who had submitted a communication from the western Kentucky operators. Smith appealed to the convention, which sustained Duncan.

The Central Coal and Iron Co. Plant Burned Down

On the eve of the settlement of the strike, the tipple of the Central Coal and Iron Co. at Central City was burned to the ground, destroying the structure and practically rendering valueless the machinery and equipment. The loss, according to Shelby Gish, manager of the company, reached $25,000, and operations will have to be suspended at the mines for some time to permit the damage to be repaired.

Two hundred and fifty men had been at work under the old schedule, the company having contracts which had to be filled. The men were working under an agreement by which they undertook to accept any scale that the operators and miners of the district would ultimately sign. It is expected that it will be early in October before the tipple can be restored and reëquipped.

Gish made the charge, immediately after the fire, that he believed it to be of incendiary origin. Two men, not identified, had been seen in the vicinity of the tipple shortly before the fire broke out, and he said the company had received numerous threats that the plant would be burned down.

On the day following, the local mine workers' union called an indignation meeting which was presided over by Mayor C. W. Wells. It was decided to raise a fund of $1,000 to be offered as a reward for the arrest and conviction of the men who fired the tipple, and the City Council has added $500 to that fund.

Is Howat Playing Politics?

Many of the operators in the Southwest believe that there is no great hope of peace. Certainly they feel that way in Oklahoma, for they are convinced that Alexander Howat wishes to make discord in the conference and that he is out for the scalp of John P. White. They argue that he wants to hoodoo White for having compelled the miners' representatives to admit the famous No. 6 clause of the New York agreement into the primary declaration of principles signed by the Southwestern conference.

This clause requires that the miners shall not seek to place in the agreement any requirement which will increase the cost of coal except in so far as the cost is increased by the stipulations in the primary declaration of principles. This clause 6 was not binding on the convention until it was signed by both the mine workers' and operators' representatives, but it was always morally of binding force. The broad-gage union leaders recognize that they are not justified in asking for larger concessions of one body of operators than they concede to another; especially is this so when the former body of operators is already paying the higher wage. So John P. White in a manly and honorable way has been trying to keep down the demands of the miners of the Southwest to the level of those accepted elsewhere.

Howat Is Said To Be Trying To Worst White

Here, it is said, is Howat's chance. He will ask for all that the miners desire. He will try to secure new advantages for the miners not granted elsewhere. The Southwest, which is already more heavily burdened than other states, will be required not only to grant as much as Illinois, West Virginia, Ohio, Indiana and Iowa, more than central Pennsylvania and still more than western Kentucky, but to outdo them all in generosity. If Howat cannot secure these concessions, he will place the blame on John P. White.

Howat has fought White on every question during the past year, and Howat has won the battle every time; as a result White has lost much prestige in the Southwest. John Walker, secretary of the Illinois mine workers, has announced his candidacy for international president against White and Howat is expected to support him. As a matter of politics Howat, it is thought, would like to see a disagreement in the Southwest. This would force White to enter the field to compel the miners to be bound by clause 6 of the New York agreement.

Clauses Which the Mine Workers Are Demanding

The main contentions of the mine workers are: Under section 4, that the mine worker who is deprived of his job for cause should be reinstated temporarily if no decision has been reached within five days; under section 7, that paydays should be weekly and not semimonthly; under section 12, that a man should be given daywork whenever by any cause he cannot be put to work in his room or entry; under section 19, that union wages should be paid to all classes of labor employed on construction or development work—that is, carpenters should receive $4 a day, bricklayers $7, and so forth. To avoid breaking off negotiations six of the disputed questions were referred back to the subcommittee. The operators desire and have offered to accept all the provisions of the old contract except as changed in the preliminary understanding.

It is not clear to the outsider, however, that Howat is really trying to repudiate clause 6 of the New York agreement except in the provisions of this proposed clause 19. Even as to this particular clause he may feel justified for he may regard the cost of development as not a burden on operation, and he may feel free to advance development and construction costs for that reason. It is possibly not a correct stand to take, but we can easily see that Howat has a technical argument in his favor.

Even If Legitimate, Demands Should Not Be Granted

It is madness, however, for the mine workers to demand anything that will hamper the operators in the Southwest. The mine workers have been their own worst enemies in that section for years. The operators would be ill-advised also to concede anything of moment above that granted elsewhere, for they are already placed at an overwhelming disadvantage.

Their contracts, which are the most liberal in force anywhere, should not be the ones to be most generously modified. It is rather contracts that are bad which should be the most abundantly improved.

It is therefore gratifying to know that the operators of the Southwest, having been assured by the Oklahoma and Missouri coal-mine owners that the latter would secede if more concessions were made, have promised to stand firmly in opposition to any extensive changes in the last biennial contract. A subcommittee meeting was held by Taylor, Lukins and Clements, representing Arkansas, Missouri and Kansas, on Saturday, Aug. 12. At this meeting, as on that held Thursday, Aug. 10, the members voted down the proposition that concessions be made.

It is the consensus of opinion of a number of operators that there is a secret understanding between Howat and some of the larger operating interests that certain concessions are to be granted to the Southwest mine workers. This suspicion is based solely on the fact that the operators' representatives under the influence of these interests yield readily toward the miners' demands. The International Organization in Indianapolis has advised Commissioner W. L. A. Johnson that it will give help if necessary, but Johnson will not divulge the sender of this telegram. The same information was indirectly obtained from the miners' officials of District 21 in Oklahoma, but it has carried little weight with Missouri and Kansas.

Wyoming Near a Compromise

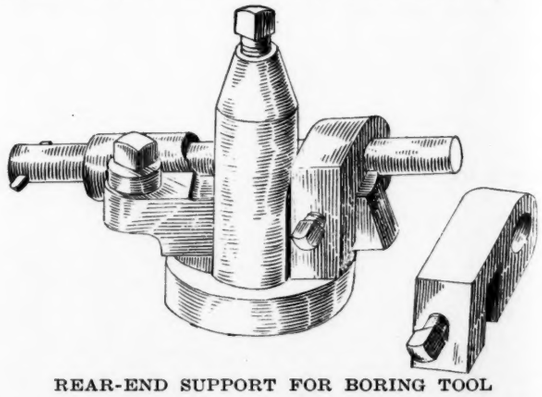
The conference between the miners' and operators' representatives of Wyoming (District 22) was still in session on Aug. 9, but the possibilities of a compromise then looked favorable. The meeting is being held at Cheyenne, Wyo.

The operators on the special committee which will draft a new scale of wage consist of William Monay, of the Kemmerer Coal Co.; P. A. Pape, of the Wyoming Fuel Co.; F. W. C. White, of the Diamond Coal and Coke Co., and W. D. Brennan, of the Union Pacific Coal Co. The miners' representatives are: W. W. Gildroy, district president of the United Mine Workers; George Young, vice-president; James Morgan, secretary, and Paul J. Paulson, national board member.

Later reports are to the effect that the Wyoming operators have conceded an increase of wage to their employees.

Support for Boring-Tool

The illustration shows an extra support for the rear end of a standard-type No. 9 Armstrong boring bar. Theodore Kruse, in *American Machinist*, says this



REAR-END SUPPORT FOR BORING TOOL

is a great improvement, as it makes the tool more rigid. The hole is a sliding fit for the bar. The rectangular slot as shown in clearer detail on the right fits over the holder and is clamped firmly by the setscrew.

Who's Who In Coal Mining

M. F. Peltier

F. S. Peabody, out in Chicago, is one of the "big guns" in the coal industry of this country. He has plenty of brains and some millions in money. Practically all of his wealth has been accumulated through his own efforts. In other words, he is what we so often hear of and talk about—a self-made man. But self-made men cannot do it all themselves. Their success in almost every instance is due as much to their ability to pick the right kind of lieutenants as to anything else. Mr. Peabody has a fine organization behind him. The men composing his forces

M. F. PELTIER
President, Monarch Coal Co. in Wyoming and chief engineer, Peabody Coal Co. in Illinois

have talent for their work or they wouldn't be there. Any man who can say he has served Francis Peabody for a score of years need not add that he is efficient and capable.

M. F. Peltier has been chief engineer for the Peabody Coal Co. for thirteen years. He is not a college man and received only a high school education, supplemented by a course in engineering at a correspondence school. Before joining Mr. Peabody he was mining engineer for the Spring Valley Coal Co. in Illinois; previous to that he served in minor positions in and around the coal mines of the Middle West.

Mr. Peltier has designed a great many complete mining plants, including steel tipples, power plants, etc. Perhaps his most important accomplishment so far is the construction of the plants of the Peabody Coal Co. at Kincaid and Nokomis, Ill. At the latter mine they hoist two 4-ton cars simultaneously, unloading the cars with a self-dumping cage—somewhat of an innovation in the methods of handling and hoisting coal. The cars are arranged side by side on one cage. The mine has hoisted more than 5,800 tons of coal in eight hours.

During the past ten years Mr. Peltier, under the direction of Mr. Peabody, has made a great many examinations and investigations of mining properties throughout the United States and Canada, for large financiers of Chicago and New York. Just recently he was made president of the Monarch Coal Mining Co., Monarch, Wyo. However, in shouldering him with these larger responsibilities, Mr. Peabody has not let him cut loose from his mines in Illinois, and still retains the valued services of Mr. Peltier as chief engineer of the Peabody Coal Co.

Mr. Peltier was born in Wilmington, Ill., in 1874, and is therefore still a very young man. His friends are proud of his record, but predict much bigger things for him in the future. He has contributed a number of interesting articles to *Coal Age* and other engineering papers and is now preparing an article that will be included in the present *Coal Age* series on underground mining. He is a member of the Illinois Society of Engineers and Surveyors and the Structural Engineers' Association of Illinois. His time is now divided between Illinois and Wyoming. It may readily be inferred that Mr. Peltier is an extremely busy man when it is realized that he has nearly a dozen mines of the Peabody Coal Co. to care for, and is foster father to an operation distant some 1,260 mi. from Chicago.

Buying Coal*

When business was largely a matter of bluff,
And cunning and fraud and deception held sway,
The purchase of fuel was simple enough,
And bore less resemblance to work than to play.
We wired the dealer, or maybe we wrote,
"Deliver two carloads by August the first,"
And added, in hope of annexing his goat,
"That last lot you sent us was surely the worst."

The stuff that he shipped us was doubtlessly coal,
In spite of its heavy proportion of slate.
We managed to use it, but out of the whole,
One-third was unburnable, simply dead weight.
The grates clogged with clinkers, the firemen raved,
And firing became a Tartarean dream,
Yet nobody cared how those fellows behaved,
So long as they kept up the pressure of steam.

But guesswork and heedlessness now are disgraced,
While care and efficiency reign in their turn,
And owners desirous of cutting out waste
Keep mighty close watch on the stuff that they burn.
They test every shipment of coal that they get—
They're all from Missouri—they've got to be shown;
And no tricky dealer is able, you bet,
To stick them with coal that is half clay and bone.

The specifications they've drawn clearly show
The heat that the fuel must yield under test,
As well as the limits to which it may go
In moisture and gases and ash and the rest.
And so, if a dealer should stoop, on the sly,
To sprinkle his shipment to add to its heft,
Or hope with a low grade of stuff to get by,
The chances are fifty to one he'd get left.

*By R. T. Strohm in "Power."

Editorials

Chemistry in Coal Mining

Coal mining was once an art that was followed "by guess and by gosh" just as the butchers' profession once called for little else than the ability to kill, skin, dress and cure. Times have changed, and today the great slaughter houses of Chicago, St. Louis and other cities turn out not only meats in great variety, but a vast array of by-products that range all the way from dolls' hair to toilet soap and glue.

Yesterday the coal mines turned out coal and nothing else. Today we have a few byproducts mostly derived from coking. Tomorrow—but who knows what tomorrow may bring forth? We hesitate about venturing a prognostication concerning the possible accomplishments of chemical knowledge scientifically applied.

But the possibilities for saving, for conservation, for utility to man are by no means confined to the utilization of the direct or primary product of the coal mine. The chemist is here slowly coming into recognized prominence just as he has in the packing industry. Who but a chemist can scientifically compound lubricants, illuminants, acid-resisting alloys? Who but a chemist is able to discriminate unerringly between different explosives and foretell accurately the results, both physical and physiological, that may be expected from each? Who but a chemist can see real possibilities for usefulness in spent carbide?

The article by A. G. Blakeley printed in the current issue should be of interest to all coal-mining men. It shows some of the many fields wherein the chemist at the coal-mine plant is not only useful but in some instances, such as fighting mine fires for example, well nigh indispensable to safety and accurate conclusions.

West Virginia's Prohibition

When West Virginia went "dry," everyone was positive that the state would rue and repeal the legislation, for it was likely to depopulate the mining region. Yet somehow the operators proved willing to take a chance, and most of them advocated the bill by which their state accepted prohibition.

Today there are still some who declare they are losing men as a result of prohibition. Some say the foreigners are keeping clear of West Virginia because it is such a dry state. It is said that 3,500 workers left the mines because they liked their beer and could no longer get it. It is also stated that bootlegging is quite common.

Yet the operators at the West Virginia Coal Mining Institute seemed in favor of temperance. While some said they were losing men, they did not appear to allege a loss of tonnage; and the year's record is confirmatory of the idea that West Virginia has not suffered by its experiment.

Take the figures as you will, you cannot show West Virginia a loser by temperance. In 1914 the tonnage of the state was 71,707,626, and in 1915 it was 77,184,069 tons. In 1914 the mines worked 201 days; in 1915, 208 days. In the former year the output was 356,754 tons per working day, while in the following year it ran 371,077 tons.

As an outcome of temperance the output per man per year, which was 908 tons in 1914, was increased to 964 tons. In 1914 the mine workers produced 4.52 tons per working day, and in 1915 this had risen to 4.63 tons.

Nor was the number of men employed reduced. In 1914 there were 78,963 men according to the count of the Bureau of Mines. According to the same authority there were 80,098 in 1915.

Better yet, the mines were safer. In 1914 one man was killed for every 128,968 tons extracted, whereas in 1915 there were 156,243 tons mined per fatal accident. This change in rate was due to the fact that the number of fatal accidents dropped from 556 to 494 while the tonnage mined increased.

On the whole the great fatality—that of John Barleycorn—has relieved West Virginia of many troubles. It will do the same for other states and other industries besides mining. No one regrets the loss of the liquor traffic, least of all the storekeepers. West Virginia in her temperance legislation has outstripped the other states of the West, and she has good proof that it will not ruin the state which adopts such measures.

Of course, there is a degree of chance about accidents, and West Virginia's growth is not wholly due to temperance, but mainly to other favoring causes; yet nevertheless one cannot read the statistics without feeling that the Mountain State has made a successful move in becoming sober.

Long Life to the Mine Worker

The mine worker seems to have a phenomenally long life. Every little while we read that such and such a place is a "happy hunting ground for veteran miners," but as a matter of fact the underground is always a healthful place for men and a baleful place for microbes.

Veterans are the rule rather than the exception. If it were not for the accident record, the duration of life of mine workers would surprise the world. The men of the temperate clime are the healthiest of all people—they have the vim to perform all kinds of laborious work. The men of the mining underworld labor in just such a temperate clime, one which is neither too hot nor too cold and which does not vary a degree, winter or summer. In the heated spell many foreign miners wearied with the night heat will go into the mines early in the morning to seek that slumber of which the sultriness of the weather would otherwise rob them.

But returning to old age, it will be remembered that on Aug. 5 we published an obituary notice of an Austrian who had been a miner from his boyhood and who came to the United States in 1886 and worked in the mines till he was over 100 years old. He lived in all 105 years 6 months and 24 days—quite a remarkable age record.

In the Kelty colliery in Scotland one man has just retired from active underground service at the age of 82, having served 71 years with the exception of but three weeks. C. A. Carlow, who took over the management 43 years ago, says he had at his table, in 1914, 35 workmen from 65 to 80 years of age who during all this period had never left the colliery.

He informed the Institution of Mining Engineers that these elderly men were all hard workers and in good health for their years. Some have since retired, but most of them are still working. When Mr. Carlow became manager the colliery was putting out only 300 tons of coal per day, so that his veterans represented a considerable proportion of the total men employed.

It might be well for some Elie Metchnikoff to inquire into miners' longevity. Perhaps the even temperature and septic air are not wholly to be given credit for the hold of mine workers on life, for the men who have lived to a ripe age in the mines appear to enjoy an exceptionally long life after they leave it. In other words, their "expectation of life" after retirement seems longer than that of other men. So the mine may not merely be protective; it may have some actively ameliorative qualities that would justify us all in becoming cave dwellers.

Pile Foundation for Transits

In the early days of surveying the extensible tripod leg was unknown. So the surveyor soon gained a remarkable expertness in setting a transit without any facilities of adjustment other than those in the tripod head. Later mining conditions compelled the use of the extensible leg.

But the older men, while quite willing to shorten the tripod as much as necessary when underground, still on the surface, clung to the immovable leg—that is, they used the mining tripod, but they forebore for a long time to use its extensibility. The ability to set up readily without the use of the clamp screws was a mark of professional dexterity not to be for a moment surrendered.

Perhaps any further modification of methods will now be resisted by those who have at last condescended to use the clamp screws on all occasions. They possibly believe that the degree of adaptability to bad ground furnished by these clamps is all that the surveyor needs. But whether they realize it or not, they do need something better than the extensible leg.

There are two types of tripod leg, one of which has a generously long point that will go deep into the ground, wedging its way into stiff clay and pushing aside roots. It has its disadvantages of course. To begin with, it sinks so deep in a soft footing that the instrument is thereby placed too near the ground for distant vision.

Then again, the legs, which should go straight into the mud, are restrained by the tripod head and inevitably bind, and in some cases the whole weight of the instrument is suspended on a bent leg until at great exertion a better arrangement is provided. But at best there is much waste of time in enlarging the holes in which the legs enter and in rearranging matters.

Often an exceptionally bad point of support showing under one leg twists the tripod head and makes another set necessary, and this may happen repeatedly so as to make the burden of instrument setting the most provoking thing in the day's work. Nor is that all. The legs may be so far extended that the clamps fail to hold, especially if the leg is already sprung in its footing. So much for the wedge-shaped shoe. The blunter shoe with a small cone point on the end is not a bit better. It is hard to push in far enough to make a firm footing. It seems to delight in getting on some support that is unequal to the task and so teetering with every motion of the transitman.

All these difficulties can be met by first driving setting-up stakes. It is far preferable to set the transit on these small piles than on a soft foundation. The instrument can then be set at any elevation at will, if necessary at an even higher level than can be attained on solid ground without their use. There is no binding of the leg in the footing, and there is no straining of clamps. The operation of setting is speedy and direct. The tripod head is not found twisted beyond the compensation provided in the leveling screws, which twisting is a condition not unusual in swamp work.

The time lost to the party by stake driving, the necessity of making and carrying the stakes, the difficulty experienced in withdrawing them, the lost time of an assistant axman are more than compensated by more rapid "sets" of the transit, a longer range of view on uneven ground with less work in consequence in field and office and the greater accuracy due to a firm base and to the use of fewer and longer sights. It is well known that short sights over rough ground make accurate work quite difficult.

The stake footing is helpful also on a steep sidehill and especially in going round a sharp point of land where sights are in most cases too short. The inaccuracy due to the imperfect alignment of the telescope, as adjusted for long and short sights, that due to the heavy plunging of the instrument and that arising from seeing only a small part of the sight rod are all largely avoided by the use of stakes, which give a longer sight and a more complete view of the object being aligned.

Errors are also eliminated when setting up among springy roots—in a pile of slashing perhaps—or in ground partly frosted. In fact, it would seem that in mountainous coal-cropping countries with heavy grades, swampy places, beds of leaves, slashings, laurel roots and like troubles the man who sets his instrument always or even usually on the ground is making an expensive mistake and wasting a needless amount of time.

Our Record-Breaking Exports

For the first time in the history of the Hampton Roads piers the weekly dumpings have crossed the 400,000-ton mark, the figures for last week showing a gross tonnage for the three railroads of 415,389 tons. The previous high record of dumping was made in the week ended Aug. 28, 1915, when 397,302 tons were handled. This record has been very closely approached in several recent weeks, as, for instance, the week of Aug. 5, when 386,489 tons were handled, and the week of June 10, when 386,998 tons were dumped.

The Hampton Roads exports, which represent a large proportion of the gross to foreign countries, have been steadily forging to the front in recent months, and it is now the exception rather than the rule when the figures fall below the 300,000-ton mark. The crossing of the 400,000-ton mark is an epoch-making stage in the export business of this country and is gratifying evidence of the way in which our trade is expanding in this direction.

Department of Human Interest

How First-Aid Contests May Be Made More Useful

By a Kentucky Correspondent

A strong and practical argument, encouraging a more general training in first aid, was made by J. E. Butler in *Coal Age,* July 29, 1916, p. 193.

Mr. Butler wisely wants the rank and file of mine workers to obtain some practical and usable knowledge of first aid. He properly objects to their being on the whole mere witnesses of events in a first-aid contest, for like spectators at a football game they are only interested in seeing others perform and gain no practical knowledge of first-aid training.

At the summer meeting of the Kentucky Mining Institute, the main feature of which was a first-aid contest, the matter of improving such affairs, so as to make them more practical, was discussed to some extent about the lobby of the Phœnix Hotel. Mr. Butler has brought out one of the points so discussed and it is one worthy of full consideration on the part of all persons interested in first-aid contests and especially so by those in charge of the arrangements for coming field events.

The point in question brought out by Mr. Butler is that the judges on the field should test the genuineness of each team's first-aid training by an oral examination. This and other points along the same line were discussed; several of these points are reviewed in this article in the hope that they may stimulate action and be incorporated in future first-aid programs. These points are listed as follows: (1) An examination of the individuals composing a contesting team. (2) A practical demonstration of how a man should be removed from the place of accident, a "dummy" being used instead of the usual live victim. (3) A choice of one member of each team by lot for the one-man event, this choice being made when the event is called on the field. (4) An award of a grand prize to the team making the highest general average on the oral examination and all field events. (5) A recognition of the fact that the main, or primary, object of first-aid training is to have the mass of miners and their women gain some usable knowledge of this work and that this end is best attained by fostering local first-aid societies in each district with the mining company placed in the background rather than obviously featuring in the lead.

Oral Examinations of Proficiency of Men

Each of these headings will be discussed in turn: (1) Examination of the individuals composing a contesting team. Mr. Butler suggests an oral examination. This examining could best be performed before the contestants are assembled on the field for the contest and it should be applied to all contestants whether they hold first-aid certificates or not. It is a matter of good fortune that but few first-aid men ever have a chance to help another man who has met with an accident and to administer first-aid treatment to him, but this same fact is a misfortune to the first-aid man himself in that he does not receive that incentive which will enable him to keep his interest and proficiency up to a dependable level. The examiners should question each team member individually and then grade each team according to the general average of its members.

When no examination is given it is possible for a team to do good work and yet have only one all-round well-trained first-aid man, the other members being capable of doing certain kinds of bandaging extra well, but not knowing much that is useful about first-aid work. For example, it would be possible for a captain to call invariably upon a certain member of his team for a certain type of bandaging, and detail another member to handle some different condition. Each member of a team should be a complete master of first aid, and only such an oral examination as proposed would adequately test the general average training of a team.

A certain percentage of the final score should be allotted to this examination, and the grade that is made on this allotment should not be divulged until the contest is over. The examination should have a weight of 20 per cent. in the final score for the grand prize.

Rescue Is Not Merely a Bandaging Problem

2. A practical demonstration of how a man should be removed from the place of accident, a dummy being used instead of the usual live victim. A man's first-aid ability receives its best test at the time and place of an accident, but such ability is not shown fully in attending to hypothetical injuries remote from the place of injury. Of course it is not possible to ascertain in a contest what any man would be likely to do when confronted with a real case demanding prompt and cool action, but this fact does not in the least bar managers of first-aid meets from devising ways of testing the judgment of competitors to some small extent in the performance of this ultra-important phase of first-aid work.

For example, a dummy, made to represent a man, such as is used in rescue stations and by football players when practicing the art of tackling, can be placed under a rock, the rock itself likewise being an artificial representation of the real article such as may be seen in museums. The rock may be placed on the dummy in such a position as to call forth the best judgment of a contestant in answering how he would proceed to aid or release the victim under the disadvantageous circumstances in which the victim is placed.

Some of the natural questions that would arise in such a case are: (a) Is the man dead? (b) If not dead, can the one man alone release him and, if so, how should he go about it? Props for levers can be placed near the scene. The rock can be put in such a position that any attempt by one man to remove it would result in greater weight being thrown onto the victim, and thus demonstrate whether the contestant is able to note such matters. (c) Is the victim in such a doubled-up position that he is slowly suffocating and, if so, can he be relieved of enough pressure to keep him alive until more help is secured?

An actual instance can be cited where a miner was caught under a slab of slate so as to crowd his knees into his chest; in this case another miner went for help and returned too late, as the victim had suffocated. Had the slate been eased up a little before going for help a life would have been saved, as no injuries were found. It should be stated to the contestant where and how far away available help could be secured. (d) Should the contestant start for help at once?

This discussion is but a suggestion as to how to put back first aid to a consideration of the things required to be done at once in case of an accident, but the plan is susceptible of a wide range of development in first-aid contests. Doubtless most *Coal Age* readers will agree that first-aid training means in popular opinion how to treat certain injuries so as to turn the patient over to the doctor in the best possible condition, while the steps that precede bandaging, involving the taking of a victim from a dangerous position, have been given almost no attention.

True, there is an imaginary wire and a victim to be taken from it and treated for electric shock in many contests, but how about a victim under a fall of rock and a live wire close to him? How act under such conditions?

Eliminating Supremacy of Star Performer

3. A choice of one member of each team by lot for the one-man event, this choice being made when the event is called on the field. This suggestion will meet with instant opposition from teams having a star performer who they think is absolutely certain of winning, but the object of first-aid work is not to develop stars but rather to have many miners know something of first aid.

Conforming to the first heading, requiring an oral examination and a grading according to the average of the team, the one-man and two-man events should be performed by *any* member of the team who happens to be chosen by lot. The object is to have each and every member of a team competent to enter such an event.

4. An award of a grand prize to the team making the highest general average on the oral examination and all other events. A certain rating should be given all events including the oral examination, and the following schedule is suggested: Oral examination, 20 per cent.; full-team event, 50; two-man event, 20; one-man event, 10; total for grand prize, 100.

Each event should have its usual series of prizes—that is, first, second, third, etc., prizes. The oral examination should likewise have its series of awards and there should be second and third grand prizes.

Avoid Making First-Aid Men Professionals

5. A recognition of the fact that the main object of first-aid training is to have the mass of miners and their women gain some knowledge of this work and this is best attained by fostering local first-aid societies with the mining companies in the background rather than in the lead. The miners should look upon first aid as their personal field and not be dependent upon the coal companies. They should have first-aid societies with small dues, as is now the practice at the mines of the Superior Coal Co., Gillespie, Ill., and they should be able to send their own teams out to win prizes for them. They should not have to wait for the company to decide whether it will send a team or not.

Where there are two or more mining camps near each other, a local first-aid society at each camp would provide pleasure and profit to the miners. The rival contests between the different camps would develop many expert first-aid men and enable them to send splendid teams to state and national meets.

The mining companies should take no active part in such societies, but should lend every encouragement and offer substantial prizes for local contests—for the society having the greatest percentage of the miners in the particular camp as active members, for women and children actively interested, for the society winning, or even attending state or Federal contests, etc. A reward should be offered to every man who passes a state or Federal first-aid examination, and a friendly rivalry developed as to which mine can have the greatest percentage of its men as holders of such certificates.

If first-aid contests are to remain events regarded with cheerful anticipation by miners, their scope should be broadened, the tendency toward following a rut warded off, and much thought be given to devising plans to make them most beneficial to the rank and file of miners. Thus we shall avoid paralleling the trend of ball playing with only its team members experts, and all others mere spectators.

Vesta Mines Finger Dressing

By C. O. Roberts*

The Vesta Coal Co. first-aid associations have had a special package of material for finger dressings added to their first-aid cabinets to obviate the disadvantages of the 1-in. roller bandage and the small bandage compress. Part of the roller bandage as generally supplied for this purpose is often used to dress an injured finger, and the remainder, well handled, is placed in the first-aid cabinet to be used in the next case. This is not the way to protect the second victim against an infection of his wound. Moreover, the small bandage compress now on the market cannot be used for a wound on the end of the finger. The Vesta Coal Co.'s aseptic and adequate dressing meets both these difficulties.

Directions for Bandaging Finger Wounds

The package contains one 10-in. triangular bandage, one compress 1¼ in. wide and 3½ in. long and several thicknesses of gauze. These are sterilized and placed in a wax-paper package measuring about 1½x1½x2 in.

In dressing a wound on the end of the finger, place the small compress over the wound, being careful not to touch the part that covers the injury, then place the base of the small triangular bandage on the inner side of the finger near the palm of the hand, bring the apex down to the end of the finger and over the compress to the back of the finger above the base and near the back of the hand; cross the ends one on each side and on the top of the finger and carry the ends around the finger and tie on the inner side of the finger near the palm of the hand.

To dress a wound midway between the first and third joints of the finger, apply the compress over the wound, then fold the small triangle into a cravat bandage over the compress, carry the ends around the finger one on either side for two or more turns; then tie the bandage on the outer side above the compress.

*First-aid instructor, Vesta Coal Co., California, Penn.

Discussion by Readers

Mine Haulage

Letter No. 2—A great number of accidents happen through the careless and improper handling of motors and cars in mines. I was glad to see a question given in the last Pennsylvania bituminous mine foreman's examination, in regard to reducing the number of accidents resulting from carelessness in the handling of cars and motors.

A careless motorman or mule driver will often try to see how fast he can travel, in an attempt to outdo another in the hauling of coal. Or, the man is in a hurry to make the bottom in time for dinner, or to gain a little time on his last trip for the day. On such an occasion a motorman or a driver will take many chances, disregarding entirely all rules for safety.

I recall a sad accident to a young driver in a mine where I formerly worked. He had the habit of making flying switches at a point where it was not necessary. He was told several times by the mine foreman and the general mine foreman not to do it again. But, whenever he thought the foreman was not around, he would fly the cars in on the switch, at the same time unhooking the tail chain and jumping out of the way himself. One day he fell in front of the trip and the entire six cars went over him. He was so badly hurt that he was not expected to live until he could be removed to his home. For several weeks the lad lay between life and death and when he finally recovered was a cripple for life and able to go about only with the aid of crutches—a sad homily on his doing what he was told not to do, especially as the act was unnecessary and dangerous.

In the answer to this question on haulage accidents in *Coal Age*, July 15, p. 124, the clearance required by law on one side of the haulage road was given as 2 ft. instead of 2½ ft., which I noticed was corrected in the next issue, page 162. It is important to notice that shelter holes 2½ ft. deep 4 ft. wide and not more than 45 ft. apart in mechanical haulage, and 90 ft. apart in mule haulage, shall be provided on all haulage roads, whether or not there is a separate travelingway.

All haulage roads should be examined daily to see that there is no loose rock overhead or bad places in the track or switches needing repair. The timbering should be closely watched, although I do not believe in any unnecessary timbering on haulage roads. When it can be done collars should always be set in hitches cut in the rib, in order to do away with the legs supporting the collar. Or, short legs should be used set in niches cut in the coal. Whenever whole sets of double timber are necessary the safest practice is to cut the ribs so that the legs can be set back in the coal where they will not be dislodged by a car jumping the track. Many fatal accidents have occurred through cars being derailed and knocking out the timbers supporting loose rock over the roadway. As far as practicable, all such loose rock should be taken down and the timbers removed. Only such timbers as are absolutely necessary should be permitted to remain.

No persons other than those whose duties require should be permitted to travel on haulage roads when separate travelingways are available. When men are caught disobeying this rule, they should be prosecuted in order to maintain proper discipline in the mine.

There should be no doors allowed on haulage roads where it is possible to avoid their use. When doors are required, they should be attended by trapper boys. Safety-first notices should be posted at all points of danger and all drivers and motormen should be given notice when they are first employed that any failure on their part to comply with the mine rules and regulations will cause their discharge, as carelessness on their part endangers both their own and the lives of others. No boy or young man under 21 years of age should be employed to drive a mule or run a motor.

There is no mention of a minimum height of roadway in the bituminous mine law of Pennsylvania, which seems to me an important omission. I have worked where the main haulage roads were not over 4 ft. in height above the ties. Motor haulage was in use in those mines and it was easy to see that a motorman or his helper would have little chance of escape in case of accident. Some foremen think it is economy to drive such roads, thereby avoiding the expense of taking down top or lifting bottom. This saving, however, is more than counterbalanced by the inconvenience and loss of time in operating the mine.

Nu-Mine, Penn. OLIVER W. YOUNG.

Handling Double-Deck Cages

Letter No. 1—My attention was arrested by the inquiry of Gaston Libiez, *Coal Age*, July 29, p. 199, regarding the use of hydraulic power for operating a double-deck cage at the shaft bottom, thereby avoiding the necessity of signaling the engineer on the surface to lower the cage so as to load the upper deck.

An apparatus similar to that suggested by Mr. Libiez, I recall, was used many years ago in Belgium and the Anzin region of northern France. Four-deck cages were in use at that time and I remember, as a boy, seeing the device in operation. It worked like a charm and often, at the end of a day of intense hoisting, both the top and bottom gangs congratulated each other on the fact that not a signal bell had been rung throughout the day, except the bell to hoist away when the last deck was loaded.

Later, when I was old enough to appreciate the value of this hydraulic device it was no longer in use in that region where I was employed. Why it was discarded I cannot say, but one reason may have been the freezing of the water in the pipe system, in the winter season. In those mines the hoisting shaft was the downcast, an exhaust fan being used at the upcast shaft. On that account the hoisting shaft was often so cold in winter that, during the night, it was necessary to make many extra trips of the cages in order to keep the guides clear of ice.

It may be suggested that the freezing of the water in the hydraulic device could have been prevented by the

use of salt. This may have been done during all the years the device was in use, as otherwise there would have been much trouble from the freezing and bursting of the pipes.

There were other reasons, however, for abandoning what was called the "hydraulic collapsible cage rest." A new system was devised, by which it was possible to load all four decks of the cage at once, while it rested solidly on the steel I-beams at the bottom of the shaft. I could not give an accurate idea of how this was accomplished without making complete drawings, which is almost impracticable and not required for the purpose of this article.

Referring again to the method previously used in which the cage was lowered by the hydraulic device mentioned, I may say that when the descending cage was brought to rest at the bottom of the shaft in readiness for loading the lower deck, the top deck of the ascending cage was in exact position for unloading at the surface landing. That cage was unloaded one deck at a time, the engineer raising it as required. In the meantime, the lower cage at the bottom of the shaft was being loaded, deck by deck, until at last the upper deck was loaded and the cage ready to be hoisted on signal from the bottom. By this time, there would be no slack rope lying on the roof of the cage at the bottom of the shaft.

To my knowledge, there was never a single breakage of rope reported, notwithstanding the swiftness that characterizes the hoisting of coal in Belgium. In those mines, 3,000 ft. deep, a complete hoist was made in from 55 to 58 sec., counting from the time one cage left the bottom to the time the other cage started on its upward trip. This freedom from accident speaks well for the hoisting engineers of Belgium, scores of whom retire every year proud of the fact that, as expressed in their own language, they had worn out two or three sets of engine cylinders without hurting a single man or bumping a single car.

F. C. CORNET,
Charleston, W. Va. Mining Engineer.

Locating a Booster Fan

Letter No. 8—I have read with interest the several letters replying to the inquiry as to where would be the best place to locate a booster fan in the mine. Before answering that question it seems to me that it would be proper to decide whether or not a booster should be placed at all in the mine.

However, I will say that if the booster is to assist the main fan in circulating the total volume of air in the mine, it should be placed in the main return airway when the main fan is exhausting, or in the main intake airway when that fan is blowing. In either case it should be located at a point as near the inner workings as practicable.

It is important to place a booster so that it will have the same effect on the air current as the main fan. This will reduce the loss from leakage in case the booster should be stopped for any reason. The leakage will be greater, in that case, if the booster is operated as a force fan while the main fan is exhausting, or *vice versa*.

On the other hand, if the booster is intended to improve the circulation in any one split or section of the mine, in my opinion it will make little difference whether it is placed at the intake or the return end or at any convenient point in the split. I believe that its action will be equally effective if placed at any of these points.

Having answered this question, I want to give briefly some of my own experience with booster fans, and wish that we might hear from others who can speak either for or against their use in mines. In my opinion the booster is not only a very annoying but a dangerous piece of machinery under many conditions occurring in the mine. When firebossing I have found the booster a source of continual worry and annoyance. In general, I believe it is true that if the money spent in installing a booster were used in repairing leaky stoppings and doors and clearing up aircourses and enlarging breakthroughs, more permanent and satisfactory results would be obtained.

The reason for installing a booster fan in a mine is that the air is insufficient in certain portions of the mine, owing either to leaky stoppings and doors or insufficient power to produce the required circulation. The installation of a fan at a point underground generally has the desired effect while the fan is running. Another effect, however, is that less attention is given to prevent the leakage of air through doors and stoppings than at previous times and, as a result, the condition in the mine becomes much worse when the booster fails to run, which frequently happens.

When Booster Fans Are Dangerous

As a rule, a booster is operated by the power current, which may be cut off at any moment by the tripping of the circuit breaker during a brief period of overload. Besides the neglect of doors and stoppings, the aircourses frequently become blocked with falls that are not removed. These hindrances to ventilation are greatly felt when the booster is thrown out of commission or is idle for any cause, since the volume of air circulated by the main fan is then greatly reduced.

I recall an instance that happened some years ago, where the wood stoppings between the main intake and return airways leaked so badly that a booster fan was installed at a point 6,000 ft. from the mouth of the mine, in the main return airway. The main fan had previously given nearly the lawful amount of air, about 46,000 cu.ft. per min. The booster increased this circulation to 97,000 cu.ft. per min. After running several months, frequent breakdowns occurred, which required the firebosses to hike at once to the danger points in the mine.

Occasionally a breakdown would occur when the mine was being examined, and notwithstanding the danger, the foreman insisted upon sending the men into the mine, as the main fan was still running. On such occasions my measurements showed that while 97,000 cu.ft. of air was circulated by the two fans, there was only 8,000 cu.ft. passing on the inside of the mine when the main fan was running alone, although there was 86,000 cu.ft. of air on the main intake. The fan was running at the same speed as when it formerly handled 46,000 cu.ft. on the inside of the mine. This result showed the evil effects that followed the general neglect of stoppings, doors and airways throughout the mine, after the booster was installed.

Another instance, I recall, where the 12,000 cu.ft. of air passing in a certain split was insufficient and a booster was installed at the intake end of the split while the main fan was exhausting. There were numerous doors

in this split all of which had to be hung to suit the booster after it was installed. Then, when the booster stopped running these doors all stood open a little under the action of the exhaust fan on the surface. The circulation in the split was thus reduced from 12,000 to 5,000 cu.ft. per min. Under these conditions gas accumulated on the rib falls in such quantities that it was often several days or a week before this could be removed, after the booster was again started. The booster might be stopped for a few hours only, but the falls would continue to give off gas for several days thereafter and kept the firebosses guessing. I hope to hear what others have to say along these lines. F. M.

Meadowlands, Penn.

The Efficient Fireboss

Letter No. 26—My attention was drawn to the remark of former Mine Inspector John Rose, *Coal Age*, June 24, p. 1102. Mr. Rose says, "The foreman is the wheel that turns the entire machinery of the mine and he is the man that is held responsible for the day's run."

While this is true, I want to say that any fireboss who is "on the job" acts as an assistant to the mine foreman, as much as one of the assistant foremen. While making his rounds each day, he will not only make note of the dangers encountered, but will carefully observe and note the condition of each working place in his section and report this information to the foreman. By so doing he will greatly assist the work of the foreman.

An efficient fireboss, on completing his examination of the mine in the morning and coming to the outside, will take steps immediately to have any places in his section needing attention put in shape at once, so that the men will not be delayed longer than necessary in getting to work. The fireboss is thus often in a position to greatly forward the work and increase the daily output of the mine.

Now, I claim that if a man is a good fireboss, he will do these things that I have mentioned as being part of his duty, and in that case the mine foreman is the gainer. On the other hand, if the fireboss neglects to do these things, the work is greatly delayed and the foreman is the loser by reason of such neglect.

In my opinion the fireboss should be given credit for the work that he does in thus assisting his foreman to increase the output of the mine. In my short experience as fireboss I have learned that much can be done in the way I have mentioned. I received most of my instruction from Mine Inspector Patrick S. King. When working under him for a time, I learned much in regard to the duties of a true fireboss, who can do a great deal to help along or who can, by his negligence, retard the work for which, of course, the mine foreman is responsible.

Oliphant Furnace, Penn. JOHN H. WILEY.

Letter No. 27—The term "fireboss," as applied to a mine official whose duty it is to examine a mine for all conditions in respect to safety, is a misnomer, since it relates to only a portion of the work performed. I want to suggest that the term "mine examiner" conveys a more accurate idea of the work and suggests the proficiency required in one who is to fill that office.

Not only those unfamiliar with mining, but many operators, mine officials and even mine inspectors seem to have little conception of the importance of the work performed by such a mine examiner. It cannot be that these individuals are ignorant of the dangers existing in mine workings, to avoid which it is necessary to maintain a constant and faithful watch. I would rather ascribe their failure in this respect to an indifference to the safety of life and property and a willingness to assume unwarranted risks. The work of a fireboss is preventive, and for this reason its value is less appreciated than work that is productive. In the hope of assisting to a proper conception of this work, permit me to submit the following brief but comprehensive survey of a fireboss' duties, as required by the Pennsylvania bituminous-mine law, which is representative:

1. Examine every working place without exception;
2. All worked out and abandoned places adjacent to live workings;
3. All roadways, traveling ways, and aircourses;
4. All falls and entrances to abandoned workings or other void places where gas is liable to accumulate.
5. Fence off the entrances to all places where gas or other danger is found to exist, and place a proper danger signal there to warn persons not to enter.
6. Complete the first examination of the section in charge within three hours of the time for the men to go to work and enter a report of the same in a book kept for that purpose, specifying what dangers, if any, have been found.
7. Make a second examination of all working places in the section in charge, while the men are at work.

The foregoing are the principal legal duties of the fireboss, but in addition to these he is often called upon and expected to perform much other work, for which he seldom gets any credit. The outline just given shows that the work is that of a mine examiner, since other dangers than that of gas must be looked for and removed. Upon the faithful performance of these duties the safety of the mine depends.

High Standard of Qualification Required

The fireboss is to the working force in a mine what a spy is to the general army. The information obtained in his daily examination acts to preserve both the life and health of the miners and the company's property. It will be conceded by all fair-minded persons that the work of a faithful fireboss has a preservative value that should be considered in the rate of his compensation.

In my opinion this work at the present time is undervalued and the fireboss, as a rule, underpaid. It seems to me that the work requires as high a standard of qualification as that of any other mine official, since the fireboss should not only be thoroughly acquainted with the properties and behavior of all mine gases and their effects on life, but should possess a practical knowledge of actual working conditions in respect to their dangers and should understand what means and measures can be adopted to avoid accidents therefrom and safeguard life and property.

In addition to those mentioned, the efficient fireboss must have personal qualities that will render his services valuable. He should be keenly observant, able to think quickly and to form an accurate judgment, besides being self-reliant, resourceful, honest and industrious. The value that should be put upon these qualities must of course be decided by the employer, who would do well,

however, to consider that "an ounce of prevention is worth a pound of cure."

It is undoubtedly true that many who hold certificates of qualification to act as firebosses or mine examiners do not possess the qualifications mentioned, at least in the degree to which they should be required. It is too often the fact that a candidate for a fireboss' certificate is subjected to a less rigorous examination than a candidate for mine foremanship, because the former position is too frequently regarded as a step toward the latter. It would be well if examining boards would, in the future, require a higher standard of merit for the position of mine examiner. I. C. PARFITT.

Windber, Penn.

Letter No. 28—Although I have read with considerable amusement the criticisms of my letter on this subject, which appeared in *Coal Age*, May 20, p. 895, I feel that they should not be allowed to go unanswered.

In the first place I want to say that I have no apology to make for anything stated in my previous letter and do not wish to retract any of the statements made. In my opinion, "Old Fireboss" wrote for the purpose of arousing sympathy for firebosses in general.

Referring to Thomas Hogarth's suggestion, in letter No. 9, June 10, p. 1026, that I have never "been a fireboss," I willingly admit the fact, but will state that my knowledge and experience of the work and duties of the fireboss have not been gained, as he and others have intimated, altogether in the office and from books.

Mr. Hogarth states, "Before one attempts to criticize the work of another, he must himself have performed that work under the same circumstances and conditions and be thoroughly familiar with its difficulties and dangers." I admit that one should be thoroughly familiar with the work he attempts to criticize, but to say that "he must himself have performed that work under the same circumstances and conditions" would debar many an efficient and capable superintendent from criticizing the work of his firebosses, trackmen, drivers, etc., because many superintendents have not occupied these positions and performed such work themselves.

Replying to Mr. Littlehale's question, on the same page, as to whether I "mean to say that any efficient fireboss would examine for gas with an open light," I answer emphatically, No, that was not my statement. I did say that firebosses have been burned when "using an open light instead of depending solely on a safety lamp as he should have done." I certainly did not class such a man as an efficient fireboss, which would have appeared by a more careful reading of my letter.

In answer to the criticism of W. T. W., in his letter No. 11, June 17, p. 1065, referring to my statement relating to the pay of firebosses and other mine officials, I want to say that I was speaking of the actual money received by the fireboss as compared with that received by other officials. I did not base that remark on the relative responsibility and work of these men. However, even on that score, I would say that the fireboss is as well paid as many others around the mine and better paid than an efficient mine foreman, in proportion to the work and responsibility of his position.

Referring to the statement of the Millfield, Ohio, "Fireboss," in letter No. 12 on page 1066, that a 12-mile walk "was not an every day act or duty" with me, I want to say he is quite correct, but the task should be easier for one who does it every day.

I am pleased to note that former Mine Inspector John Rose, of Tennessee, who was himself a fireboss for many years, in his letter No. 15, June 24, p. 1102, approves my views in the matter. Also, I want to heartily indorse the statements made by C. O. Messenger, in his letter No. 13, June 17, p. 1066. EDWARD H. COXE.

Pittsburgh, Penn.

Letter No. 29—An efficient fireboss should be a good practical man who has had experience in both room and pillar work in gaseous mines. Without this experience, it will be impossible for him to properly perform the duties of a fireboss.

Unless a man has mined pillars and drawn entry stumps, he is not capable of telling when such work is being safely performed by others. Neither will he have the nerve to climb to the top of a fall when making his first rounds in the morning before the men have entered the mine. Instead, he will take a chance and leave such places to be examined after the men have come to work. Nor can be give suitable instructions to the men in his charge unless he has had actual experience in the work himself.

I regret to say there are many firebosses, at the present time, attempting to tell men how the work should be performed when they themselves have never loaded a car of coal. The same is also true of some mine foremen, and miners know how hard it is to work under such a man as foreman. My own experience began as trapper boy and, from that time to this, I have filled almost every position in the mine to assistant foreman.

In firebossing, a man must do what the law requires. He must be conscientious in his work, and when he finds something wrong with the ventilation a good fireboss will hunt for the trouble, though it may take some time to find it. In my opinion, a fireboss' run should not be so large that he cannot complete it in two hours, which would give him a spare hour to hunt around in case there is trouble. In most mines, I am sorry to say, this is not the case. The fireboss today must be a good foot runner in order to complete his rounds in time to let the men enter the mine at the appointed hour. To do this many firebosses will slight portions of their work and take chances. JOSEPH HOWE.

Heilwood, Penn.

Letter No. 30—In a recent issue of *Coal Age* there appeared in the "Special Opportunities Section" an advertisement that read as follows:

> A safety inspector wanted; not a fireboss, but a man of sufficient intelligence and experience in and around mines to make suggestions looking to avoidance of accidents and personal injuries.

The wording of the ad was seemingly a reflection on the intelligence of the average fireboss. If it was inserted by a coal company, I want to suggest to them that they will find the man they want in their mine if they will take the trouble to hunt him up. I would urge them further not to overlook the firebosses in their search, as many of these men are well fitted by knowledge, training and experience to act as safety inspectors. Many mine superintendents, foremen, assistant foremen and a few of our best managers are proud of the fact that they rose from the position of fireboss.

There is one hindrance to the fireboss position. He rarely gets the opportunity to display his intelligence to others than those directly over him. The efficient fireboss is a close observer of conditions, and it can be truthfully said there are few of these men who could not suggest many improvements of practical value, in respect to the section of mine in charge, were they asked or permitted to do so. His habits, training and opportunities fit the fireboss in a peculiar manner for suggesting ways and means of avoiding numerous difficulties common in mines; but, knowing that his opinion is not asked, the fireboss is too wise to display his intelligence.

In my experience as fireboss I was frequently compelled to close my eyes to chances that were taken by my superiors, although I knew that the result might cost many lives including my own. In a few instances I did offer slight objection. I remember on one occasion the mine foreman was running coal from two sections of the mine, while the third and most gaseous section was idle on account of repairs that were being made on the haulage road. He laid off the fireboss in charge of the idle section, saying that it would not be necessary to examine that section while it was idle.

Inasmuch as my section was ventilated by the return air from the idle section and it was a common occurrence for one-half of the latter to be fenced off on account of gas, I made bold to tell the foreman that I thought it was dangerous to allow the men to enter my section of the mine when the idle section had not been examined. I may say that the real nature of that section was better known to me than to the foreman. Replying to my statement, he asked if I had found my section safe when making the morning examination, and on being assured that I had, he said that was all that was required to comply with the law. Knowing the danger that was imminent, I insisted that it would not be safe to allow the men to enter for work until that section of the mine had been examined. The result was that I lost my position as fireboss in that mine.

At another time when acting as nightboss in a mine, I found considerable rockfalls where the ribs were being drawn. I reported that the falls were making a good deal of gas. Since this would mean the use of safety lamps in that section, the mine officials discredited my report and worked that portion of the mine as usual. I kept a close watch of the place, however, and made my first visit in the rib workings. I found the ribs working badly and hastened on to the rooms where the cutters were employed on the return air from that section. Fifteen minutes after getting the cutters out of the place, the rock broke and the volume of gas given off filled my lamp with flame in the three room necks beyond the fall.

Sending the men out of the mine, I returned and found the condition still the same, although there was a good current of air passing in that split. I reported the gas on the record book and also informed the mine foreman of the condition during the night. However, my report was again discredited, because the same day, the fan having been speeded up, there was not sufficient gas given off to show on the lamp.

These are a few instances to show what the fireboss gets up against when he tries to perform his whole duty to the law and to the men in his charge.

Meadowlands, Penn. F. M.

Safety in Blasting

Letter No. 1—To anyone acquainted with the practical operation of dusty and gaseous mines, "permissible powder" is but a synonym of "safety first." One is forcibly impressed that these two go hand in hand in the attempt to safeguard life and property in mines and prevent the recurrence of such dread mine catastrophes as have occurred in the past.

Despite the humane intentions of coal companies, the money spent for safety, the watchful vigilance of capable and trained mine officials, and the laws enacted to increase the safety of mining operations, disasters still continue to occur, and after each dread event is heard the question, "How did it happen; what was the cause?" But, the man who knows is invariably one of the victims of the destroying blast or the later afterdamp of the mine. Investigation serves only to name one or more possible causes, but the actual fact in most cases remains a hidden mystery.

In this connection, permit me to say a word in reference to the use of permissible powders in blasting. The mistake most frequently made in the use of permissibles, especially by the foreign miner, is the insufficient tamping of the hole in which the charge has been placed. When a charge is exploded in the coal the force naturally follows the line of least resistance. A foot of stemming is insufficient to hold its own when a charge is exploded in a deep hole, and the tamping is blown from the hole, the result being a "blownout shot." Or, the charge of powder may be more than that required to break the coal, and a "windy shot" results from much of the explosive force being expended on the air after the coal is broken down.

Where shotfirers are employed, the danger is not so great. Most of them are capable men, although there is woeful ignorance among even these regarding the amount of tamping required by permissible powder. These powders are put up in a form resembling that of dynamite, and the idea prevails widely that they require no more tamping than dynamite. The average miner knows but two kinds of powder—black powder that burns with a puff of smoke unless securely tamped, and dynamite that requires practically no tamping. He has yet to be taught that permissible powder, while its action is quicker than that of black powder, requires to be thoroughly tamped in order to develop its full efficiency.

It is a common thing for a powder demonstrator, when making his rounds with a shotfirer at night, to find that a miner has left tamping enough for but a single hole and there are three holes to fire. The shotfirer then has the choice of dividing the tamping among the three holes, with doubtful results, or firing one hole and letting the others remain, as he has no time to hunt more tamping.

Another evil is using too short a fuse, or biting off the end of a squib, or dipping it in oil to make it burn faster. Such practices have cost many lives, but how are they to be overcome? Men are too scarce to discharge the offenders and remonstrance is practically useless. With a desire of instructing miners in the proper use of the powder, manufacturers of permissibles have placed in each carton a small booklet printed in Slavish, explaining many "dont's" that would avoid danger. The imposing of a fine, in the opinion of a West Virginia mine inspector, brings the best results, as the miner will then generally think twice before doing the same thing again.

Pittsburgh, Penn. FRANK A. HALVERSON.

Inquiries of General Interest

Bending Stress in Wire Rope

Kindly explain what is meant by the "bending stress" in a wire rope and how this is calculated. Does the bending stress in a rope ever exceed the load hoisted and must it be deducted from the safe working load when estimating the size of rope required in a given hoist?

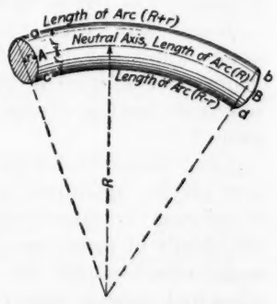
Dunfermline, Ill. MINE MANAGER.

When a rope is bent as in passing over a sheave the outer wires of the rope, at the point of bending, are extended while the inner wires are compressed about an equal amount. The center line of the rope is its neutral axis. The same condition holds true for the fibers of a single wire of the rope, and the extension of the outer or "ultimate fiber" represents a certain force, which is the stress due to bending or the "bending stress."

The total breaking strength of a wire rope is calculated from the ultimate unit stress or the unit stress of the ultimate fiber of the rope, since the rupture of that fiber marks the limit of strength in the rope.

The strength of any elastic material, within the limits of elasticity, is calculated from a factor called the "modulus of elasticity" of the material. The modulus of elasticity is the ratio of the unit stress (lb. per sq.ft.) to the unit extension, or the extension per unit length.

Referring to the accompanying figure, it is clear that the length of any arc is proportional to its radius of bending. Then, calling the radius of curvature of the neutral axis of the rope R, the diameter d of the rope being $2r$, the relative lengths of the several arcs are: Neutral axis, R; outer fiber of the rope, $R + r$; and inner fiber of the rope, $R - r$. But, taking a length R of the neutral axis as the original length of the portion of rope considered, the extension of the outer fiber is $(R + r) - R = r$.



Likewise, the compression of the inner fiber of the rope is $R - (R - r) = r$, showing the extension in the outer fibers of the rope to be equal to the compression of the inner fibers. The extension of the outer fiber per unit length is, therefore, r/R, or expressed in the corresponding diameters d/D. That is to say, when a rope is bent over a sheave the unit extension or extension per unit length in the outer fiber of the rope is equal to the ratio of the diameter of the rope to the diameter of the sheave.

But, by definition, the modulus of elasticity (E) is the ratio of the unit stress (f) to the unit extension (d/D), which gives the formula

$$E = \frac{f}{d/D}; \text{ or } f = E\frac{d}{D}$$

In American rope manufacture the ratio of the diameter of the wire to the diameter of the rope is, for 7-wire haulage ropes, 1:9; and for 19-wire hoisting ropes, 1:15. Hence, the diameter of the rope being d, that of the wire is $d/9$ for 7-wire, and $d/15$ for 19-wire ropes and the diameter of the sheave being D, we have for the formula for bending stress in the outer wires of the rope as follows:

Haulage ropes, 7-wire, $f = E\frac{d}{9D}$

Hoisting ropes, 19-wire, $f = E\frac{d}{15D}$

Finally, the effect of the bending stress in the outer wires of a rope bent over a sheave, or its equivalent load on the rope, is found by multiplying the unit stress in the outer wire due to bending, by the sectional area of the wire, and that product by the number of wires in the rope. The number of wires in a 6-strand, 7-wire rope is $6 \times 7 = 42$ wires, while that in a 6-strand, 19-wire rope is $6 \times 19 = 114$ wires, and remembering that the diameter of the wire, for 7-wire haulage ropes, is one-ninth of the diameter of the rope, and for 19-wire hoisting ropes, one-fifteenth of the diameter of the rope, we have for the total bending stress S, in a rope whose diameter is d, when bending over a sheave having a diameter D, as follows:

Haulage ropes, 6-strand, 7-wire,

$$S = 42 \times 0.7854\left(\frac{d}{9}\right)^3\frac{E}{D}$$

Hoisting ropes, 6-strand, 19-wire,

$$S = 114 \times 0.7854\left(\frac{d}{15}\right)^3\frac{E}{D}$$

These formulas give the total load due to bending, which must be added to the actual load hoisted and a certain allowance made for friction when hoisting in a shaft. The friction of the hoist may be estimated as, say one-tenth of the load hoisted.

The load due to bending may be less or greater than the actual load hoisted, and must always be taken into account when calculating the safe working load of a rope. In wire-rope practice, the modulus of elasticity of steel may be taken as 29,000,000 lb.

For example, the bending stress developed in a 1¼-in. cast steel, 6-strand, 19-wire hoisting rope when bending over a sheave 8 ft. in diameter, is

$$S = 114 \times 0.7854\left(\frac{1.25}{15}\right)^3\frac{29{,}000{,}000}{8 \times 12 \times 2{,}000} = 7.8 \textit{ tons.}$$

Allowing a factor of safety of 5, the safe working load for this rope is $L = 39d^2/5 = 39 \times 1.25^2/5 = 12.2$ tons. Hence, the permissible load including friction of hoist, in this case, is $12.2 - 7.8 = 4.4$ tons, which makes the net permissible load hoisted 4 tons.

In this case, it will be observed, the stress due to bending the rope over an 8-ft. sheave (7.8 tons) is much in excess of the permissible load, which is found to be only 4 tons after allowing one-tenth for overcoming the friction of the hoist. The bending stress must always be calculated and subtracted from the safe working load to determine the maximum permissible load that can be hoisted with safety.

Examination Questions

New South Wales Examination First-Class, April 11, 1916

(Selected Questions)

Ques.—A double-acting pump with a 6-in. piston and 4-ft. stroke makes 15 strokes per min. How many gallons per hour will it lift from a depth of 1,200 ft., and what will be the engine power required?

Ans.—Assuming the pump is in fair condition, the efficiency of the water-end may be taken as 85 per cent., and the discharge will then be 85 per cent. of the piston displacement, which gives

$$G = \frac{60 \times 0.85(0.7854 \times 6^2 \times 4 \times 12 \times 15)}{231} =$$

say 4,500 *gal. per hr.*

Before the engine power can be calculated, it is necessary to know the size of the column pipe in order to estimate the friction head against which the pump must operate. Assuming, in this case, a 4-in. column pipe, for a discharge of 4,500 ÷ 60 = 75 gal. per min., the friction head is

$$h_f = \frac{f\,l\,G^2}{8\,d^5} = \frac{0.01 \times 1{,}200 \times 75^2}{8 \times 4^5} = 8 + ft.$$

Adding this friction head to the depth of the shaft, and allowing, say 12 ft. more for suction lift at the sump, gives a total head of 1,220 ft., against which the pump must operate. This corresponds to a pressure of 1,220 × 0.434 = say 530 lb. per sq.in. To overcome this resisting pressure, with a steam pressure of 60 lb. gage at the throttle, will require that the diameter of the steam cylinder of the pump be three times that of the water cylinder, or 3 × 6 = 18 in.

Allowing an efficiency of 75 per cent. in the steam end of the pump will require an engine power of

$$H = 0.00034\,Gh = 0.00034 \times 75 \times 1{,}220 = 311\ hp.$$

Ques.—A fan running at 40 r.p.m. is producing 65,000 cu.ft. of air per min. What quantity of air will be produced if the speed of the fan is increased to 55 r.p.m.?

Ans.—Assuming the conditions in the mine remain unchanged, the quantity of air in circulation is roughly estimated to vary as the speed of the fan. In other words, the quantity ratio is equal to the speed ratio, approximately, which gives in this case

$$\frac{Q}{65{,}000} = \frac{55}{40}$$

$$Q = 65{,}000\left(\frac{55}{40}\right) = \textit{say}\ 89{,}375\ \textit{cu.ft. per min.}$$

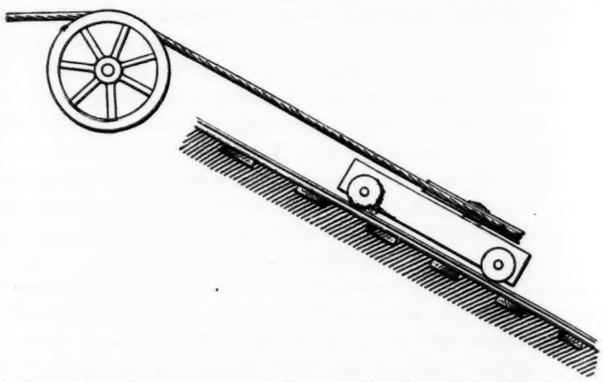
More accurately, the fifth power of the quantity ratio is equal to the fourth power of the speed ratio, which gives, in this case,

$$\left(\frac{Q}{65{,}000}\right)^5 = \left(\frac{55}{40}\right)^4; \quad Q = 65{,}000\sqrt[5]{\left(\frac{55}{40}\right)^4} = 1.29$$

$$Q = 65.000 \times 1.29 = 83{,}800\ \textit{cu.ft. per min.}$$

Ques.—In an endless-rope haulage, where should the apparatus for taking up the slack be placed? Show by sketch a wheel mounted on tension carriage and explain your arrangement for obtaining the proper tension.

Ans.—The tension carriage, or balance car, should be mounted on a truck running on a suitable incline which is located immediately back of the winding drum of the engine. The rope running off from the drum passes over the sheave on the balance car, as shown in the accompanying figure, before being conducted into the mine. The



balance truck or car must be weighted sufficiently to obtain the necessary tension on the rope running into the mine. This tension will depend both on the weight of the balance car and the inclination of the track on which it runs. The figure shows clearly the arrangement.

Ques.—State what you know of the means used to soften water for boiler-feed purposes. What chemical changes are effected in the water during treatment, and how does hard and impure water operate on the boiler plates?

Ans.—Boiler-feed water often contains different kinds and varying quantities of salts and other matter held in solution or suspended in the water. The salts consist chiefly of carbonates and sulphates of lime and magnesia, which render the water "hard," besides oxide of silica and organic matter held in suspension. Pyrites in coal formations renders the mine water acid, and corrosion of the boiler plates results from the sulphuric acid formed, attacking the iron. The boiling of the water precipitates the carbonates and sulphates of calcium and magnesia when these are present, and there is formed a hard crustation or scale that lines the inside of the boiler. The presence of organic matter in the water greatly assists the formation of scale in this manner.

Impure feed waters should always be treated to neutralize any acid that may be present. Feed-water heaters and settling tanks are used to precipitate the impure salts and organic matter. When feed water is impure, the boiler should be partially blown off two or three times a week where this method of eliminating some of the impurities in the water is found of advantage. In all cases, impure feed water should be analyzed to determine the proper treatment for purifying the water. Petroleum or coal oil has been added to feed water with good results.

Coal and Coke News

Washington, D. C.

A railroad may not be expected to pay for coal lost in transit except that right be established by a court of law, according to a decision just issued by the Interstate Commerce Commission in the case of the Southwestern Portland Cement Co., Inc., against the Texas & Pacific and other railroads. The commission held that the charges collected by the railroads on coal in carloads from Haleyville, Okla., to El Paso, Tex., were not unreasonable or otherwise in violation of the act. This decision sets a notable precedent.

The mine weight of one of the shipments in question was 101,900 lb. and the other, 85,800 lb. At the destination these shipments weighed 60,700 lb. and 55,980 lb. respectively. The freight charges had been paid upon the mine-weight basis. The shippers filed a complaint asking for reparation upon the basis of $1.40 per ton for the coal lost in transit, the tariff rate upon the shipments being $3.15 per ton. The claim was taken to court, which held that the shipper was entitled to recover the invoice value of the coal, but the railroads appealed the case, and it was pending upon appeal when the complaint was taken to the Commission.

The Commission decided:

The allegation that the charges collected were unreasonable is predicated solely on the fact that the loss in transit resulted in proportionately greater charges on the quantity of coal delivered than if the loss had not occurred. The loss of the coal may have been a breach of defendants' legal duty to complainant, and also of the contract of carriage, but the duty to transport shipments safely is not imposed by the act to regulate commerce and hence the non-performance thereof is not a violation of the act. It is well settled that the only recourse that shippers have with respect to such infractions of their legal rights is in the courts, where the responsibility, as well as the fact and the amount of loss or damage, may be determined.

Without deciding the question of whether or not the Commission has jurisdiction in any case over claims for refund of freight charges on property lost in transit, we find upon the particular facts of record in this case, the complaint in which does not put in issue the reasonableness of any rate, minimum weight, rule, regulation, or practice of defendants, that the charges assessed have not been shown to be unreasonable or otherwise in violation of the act.

Commissioner Harlan dissented from the view expressed by the majority of the Commission declaring that inasmuch as the reasonableness of the rates and charges of carriers have been held by the courts to be a matter for cognizance solely by the Commission, it is difficult in the face of such finding to see how anything is left for the courts to decide. He added:

It is true, as stated in the majority report, that the complaint puts in issue no rate, rule, or regulation of the defendant carriers. But section 1 of the act does not deal alone with rates, rules, and regulations. It deals also with the charges of common carriers and declares any unjust and unreasonable charge to be unlawful. When a carrier delivers only a part of a shipment but nevertheless collects charges on the full weight, I cannot escape the conviction that the charges have been shown to be unreasonable and therefore unlawful.

As I understand the majority report and its consequences to the complainant, it not only shuts the door of the Commission, but in effect has also closed the doors of the courts.

Various Hearings Will Be Held

A hearing on the coal rates from Pennsylvania mines to Rhode Island destinations has been scheduled by the Interstate Commerce Commission to be held in Providence, R. I., before Examiner Hillyer. This hearing will deal exclusively with the so-called fourth section applications of the railroads which request authority to continue to charge on the transportation of anthracite coal from points of origin in Pennsylvania to Darlington, R. I., rates which are lower than the rates contemporaneously maintained on like traffic to Olneyville, R. I., and other intermediate points. Such applications have been filed by the New York, New Haven & Hartford; Delaware & Hudson; Philadelphia & Reading; Central of New Jersey; Erie, and Lehigh Valley railroads.

A hearing on the Lake coal rate situation will be held in Detroit, Mich., on Oct. 2. The Interstate Commerce Commission has given notice that this hearing will be conducted by Examiner Marshall, the cases embraced in the inquiry being that of the Pittsburgh Coal Operators' Association against the Pennsylvania and other railroads, and the case of the Lake Cargo Coal Rates which was instituted upon the Commission's own motion. The investigation is designed to fix the level of rates and the differentials between the various coal fields in Pennsylvania, Ohio and West Virginia on coal to the Lake ports for shipment beyond via water.

HARRISBURG, PENN.

The state compensation insurance fund, according to the report of Assistant Manager Albert L. Allen, made on Aug. 12, is paying out only 58.5 per cent. of its earned premiums in losses. The figures cover the period from Jan. 1 to Apr. 30.

The report indicates that the state has written more compensation business than all of the mutual companies combined. While the record is unique, it is as an educational agency that the state fund occupies a still more unusual position in the insurance field.

The fund is a "bear" on the rate question, and since its inauguration its officials have been devoting a large portion of their energies to the task of reducing premium income by reducing risks. Regarding the inspection work, Mr. Allen says:

The staff of this division has been in the field making preliminary inspections under the schedule rating plan. By this method, we are able to extend a service welcomed by policyholders. Recommendations are submitted immediately after the visit of our inspector in order that the employer may improve defective and unsafe conditions before the official inspection for rating is made.

Inspections are made for the following reasons: To determine the proper classification of a risk and subdivision of the payroll for the information of the underwriting department; to assist the employer in fulfilling the safety standards of the rating bureau in order that his rate may be reduced; to instruct employers whose plants have not been inspected for schedule rating with respect to improvements that should be made to secure the lowest obtainable rate, and reinspect plants already inspected in order to ascertain if safety recommendations have been given proper attention.

It is expected that the fund will reach the million-dollar income mark by the end of the year. When the compensation law took effect the fund had 5,097 policyholders and annual advance premiums of $445,904.23.

In order to be sure the state fund broad reinsured its catastrophe hazards to the extent of $50,000.

The predications as to the future are based upon the fact that by the end of April the fund had 12,032 policyholders, which number has been much increased since that time. The earned premiums for the first four months were 58.5 per cent. Premiums in force to the end of April were $682,209.58, covering 117.138 employees. The earned premiums for the period were $199,211.38, expenses $37,732.20, losses and loss reserve $116,535.32 and investments $337,773.

Compensation Begins at Once

In case of death, compensation to be paid under the Pennsylvania law begins at the date of death, is the ruling made by James W. Leech, a member of the state board, in an opinion filed Aug. 12, overruling objections to the award of Referee Houck, in the case of a Schuylkill County miner's wife.

The employing company appealed, citing that compensation was not to begin until 14 days after disability. The opinion says:

One of the principal objects of postponing the payment of money compensation to disabled workmen until the expiration of 14 days was to prevent that petty and most annoying malingering, the exaggeration of the harmful effects of a trifling injury so as to obtain a few days' holiday at half pay. Obviously death cannot be simulated nor exaggerated and prompt and immediate relief of the bereaved family is of peculiar importance.

Two Serious Accidents

Two serious mine disasters occurred in the Wyoming Valley, Luzerne County, recently, within 24 hours of each other. The first claimed a total of 6 lives, in the Woodward colliery of the Delaware, Lackawanna & Western R.R. Co., at Edwardsville, and in the second, two were instantly killed and three probably fatally injured, in No. 6 colliery of the Pennsylvania Coal Co., at Inkerman.

At the Woodward colliery, three men were killed instantly, being burned almost beyond recognition by the burst of flame, the other three men were so badly burned that they died one after another, within a few hours after they reached the hospital.

The victims were working at the end of a slope and were trapped beyond possibility of escape when the explosion occurred. The fact that the damage was done at the extreme end of a slope working, probably saved many others from being injured. The explosion affected only a small area.

The cause of the accident has not been definitely determined. It is thought that it might have been caused by some careless miner igniting a match to light his pipe, thus setting off a quantity of gas. James E. Roderick, chief of the Department of Mines, with Mine Inspectors D. T. Davis and Joseph J. Walsh, entered the slope immediately after the explosion and made a thorough investigation.

One of the strictest rules of the mine is that no lamp shall be used other than that provided by the company. This is of an approved locked safety type. After the explosion a fire started in the mine, which burned for several days.

In the Pennsylvania Coal Co.'s mine, a gas explosion took place in the Marcy vein, which for years has been among the safest and most nearly gas-free bed in the upper anthracite region.

The explosion occurred almost as soon as the men started work, about a mile from the foot of the shaft. It was probably caused by a drill tapping a gas pocket.

The rescuers at this mine met considerable difficulty in reaching the spot where the explosion took place as its violence was such that it had displaced mine timbers and piled up heaps of débris.

PENNSYLVANIA

Anthracite

Pittston—For sanitary reasons, the Pennsylvania Coal Co. is covering an open water course running from the No. 9 colliery through the Fourth ward of Pittston.

Wilkes-Barre—Five men were overcome by blackdamp from an old working in No. 4 colliery at Nanticoke recently. The men were in one gang and lay unconscious for several hours before being discovered by an official making an inspection. The men are in a serious condition. Because of the coal shortage, due to the scarcity of labor and the continued demand for shipments, the Lehigh Valley Coal Co. has decided to cancel its annual outing, which was to have been held at Bellwood Park, N. J. The present demand, it is pointed out, makes it imperative to operate the mines continually, and in order that the trade might not suffer, the executive committee of the Lehigh Valley Coal Co. Social Association, at a meeting held in Hazleton, decided to forego the pleasures of the annual affair. This company will also attempt to operate its mines on Labor Day, Sept. 4.

Shenandoah—All the collieries and washeries in the Shenandoah Valley were compelled to suspend on Aug. 11 for want of railroad cars, throwing 8,000 men and boys out of employment.

Hazleton—Much new work is being arranged for at Cranberry colliery, recently bought by the Lehigh Coal and Navigation Co. from A. Pardee & Co. A rail line is to connect the Harwood and Cranberry operations. The first-aid corps has been revived. A big addition will be made to the breaker and a new slope sunk so as to shorten the distance on underground hauls.

Bituminous

Hooversville—Borough authorities and company officials are endeavoring to learn who set off a quantity of dynamite recently near the plant of the Baker-Whiteley Coal Co. Many windows were broken and other damage done by the explosion. Judge William H. Rupple has granted a preliminary injunction, restraining striking miners from interfering with men who desire to work before the strike is settled. Between 500 and 600 miners are on strike. The injunction was issued on a bill in equity filed by the Somerset Mining Co., the Wilbur Coal Co., the Knickerbocker Smokeless Coal Co. and the Baker-Whiteley Coal Co. The companies objected to newspaper advertisements by the miners' union in which workmen were warned of the strike and requested to stay away from the mines.

Ralphton—The Somerset Coal Co. has imported a number of Mexicans into Somerset County to work in the coal mines. About 100 have been brought by the Quemahoning Coal Co. and a larger number to the Consolidation Coal Co.'s mines, near Boswell.

Johnstown—The coal mines of this district are suffering serious shortage in both cars and men. Some mines receive but 30 per cent. of their car allotment. Shipments of coal to Eastern markets are being delayed just when the New Haven railroad embargo is lifted and when operators are anticipating a big harvest, with a corresponding increase in the amount of work for their men. Predictions are freely made that an acute famine in mine labor will occur during the fall and winter.

Nettleton—The office building of the Nant-Y-Glo Coal Mining Co. was burned to the ground on the evening of Aug. 9. The origin of the fire is not known.

Punxsutawney—The coal-mining industry through the central bituminous section is extremely active. It has been a long time since the mines in this part of the state have worked more steadily. The full capacity is not maintained for the reason that there is a shortage of between 15 to 20 per cent. in laborers. One reason why the mines are working so steadily is because the embargo on shipments to the New England states was lifted recently. For a number of weeks it was impossible to make shipments east, but now the railroads are able to handle the traffic and the coal is moving as usual. The threatened railroad strike has given impetus to the coal industry, and the manufacturing concerns are stocking up while they are able to receive shipments. The result is that in the counties in the central-western part of the state the coal-mining industry is booming and the people are more than ordinarily prosperous.

Bituminous

Connellsville—High temperature combined with a lack of labor and a car shortage recently reduced coke shipments from the Connellsville region to 397,000 tons. This is the first time that the weekly record has gone below 400,000 tons since the latter part of February.

Somerset—A section of Somerset County is to profit by the plan of the Cambria and Clearfield County coal operators for establishing safety stations. It has been announced that the Victor and Grazier plants, both in the vicinity of Hollsopple, will be included in the territory covered by the emergency station at Portage. It is not known whether the Somerset mines will be included or not.

Coral—A well authenticated rumor is current to the effect that the Donahue Coal and Coke Co. has about concluded a deal whereby it will take over the coking plant of the Wharton Coal and Coke Co. at Coral. It is said that the new owners will assume control of the plant about Sept. 1.

Uniontown—The third annual safety-first rally and dance of the employees of H. C. Frick Coke Co. was recently held at Shady Grove Park under the auspices of the Continental Nos. 1, 2 and 3 safety committee. It is said this was the most successful affair of its kind ever held. Approximately 2,500 employees with their families and friends, including executives and superintendents, were in attendnce.

WEST VIRGINIA

Fayetteville—Suit has been entered by the Nuttall estate against the Lookout Coal Co. and the Blume Coal Co., operating mines on the Nuttall properties on Kenney's Creek, for the payment of royalties alleged to be due. The amounts asked of the two companies, respectively, are $4,000 and $5,000.

Logan—The Argyle Coal Co., operating a mine on a tract of 1,200 acres on Rum Creek, with a production of 10,000 tons a month, has been reorganized, following the acquisition of a controlling interest by the W. E. Thurmond estate, which now owns virtually all of the stock. The interest was purchased from the C. T. Jones estate, for a price said to be around $75,000. New officers of the Arygle company have been elected as follows: President, J. S. Thurmond; secretary-treasurer, W. R. Thurmond; superintendent, W. T. Harvey.

Charleston—The next hearing by the Interstate Commerce Commission of the controversy between railroads and West Virginia operators over the proposed increase in rates on coal will be held at Detroit, Mich., on Sept. 25, in order to give Michigan dealers and public interests a chance to be heard. It is believed that evidence concerning the grave effect of the proposed raise on Michigan consumers will have much weight with the Commission. It is estimated that the increased rates would add $2,500,000 to the cost of the West Virginia coal used annually by Michigan consumers.

KENTUCKY

Pineville—The Asher Coal Mining Co. has begun the erection of a two-story brick office building here.

Herbert M. Wilson, of Pittsburgh, head of the department of inspection and safety of the associated insurance companies, which are carrying much of the Workmen's Compensation insurance risks in the mines of this section, with a corps of inspectors, is at work here. The basic rate, named and accepted by the companies, is $4.24 per $100 of payroll, with medical attention, and $3.82, excluding medical attention, being subject, however, to modification according to safety conditions, the chief factors being safety organization, surface hazards, underground hazards and explosives. When inspection shows a mine above the average a reduction is recommended, when below, the operator is given three months in which to remedy defects in safety appliances and a second inspection is then made at the request of the operator.

MARYLAND

Cumberland—The Wendel mines of the Maryland Coal Co. are running to as great a capacity as possible, considering the

present supply of labor. The mines are working 700 men and turning out 3,500 to 4,000 tons of coal per day. There is, however, plenty of work for more men, if these can be secured.

OHIO

Bridgeport—According to the estimate of C. J. Albasin, representing Ohio operators in this district, not less than 4,000 additional miners are now needed in eastern Ohio mines. All mines in the section are operating, the industry enjoying the biggest boom in its history following the two-year layoff caused by labor troubles, and the only difficulty now faced by the trade is to get enough men to work the mines to their full operating capacity.

Columbus—Official announcement is made that the Maynard Coal Co., of Columbus has purchased the dock holdings of the Sunday Creek Coal Co. at Superior, Wis., and will open offices in Minneapolis to conduct a general dock business. The dock was operated by the Sunday Creek Coal Co., of Wisconsin. It has 2,550 ft. of water front and is one of the largest in the upper lake region. It contains almost 12 acres for the storage of coal. The Maynard company will probably organize a separate corporation to operate the dock property.

INDIANA

Brazil—One of the largest coal-stripping outfits manufactured is being installed in Staunton by the Rollins Coal Co. This firm has leased 350 acres west of the town, and it is estimated that there is enough coal under this tract to keep the plant in operation for 25 years. The largest steam shovel procurable is being set up and will be put in operation soon. This machine has a dipper capacity of 8 cu.yd. The coal, which is an excellent quality of bituminous fuel, lies from 20 to 40 ft. below the surface.

ILLINOIS

Pana—When a committee of miners went to the Springfield mine of the Smith-Lohr Coal Mining Co. to request the discharge of the men held responsible by the Coroner's jury for the explosion in which four men were killed recently, a pitched battle occurred. On account of the trouble, work at the mine was not resumed, as had been planned.

Springfield—A. J. Maloney, W. S. Bogle and Harry Devereaux have returned from Washington, where they made a fight before the suspension board of the Interstate Commerce Commission against the suspension of the rate of $1.25 per ton on fine coal from the Springfield district to Kansas City, which has been announced by the Chicago & Alton and which the Missouri, Kansas and Oklahoma operators are trying to prevent going into effect Aug. 22. At the conclusion of the hearing the suspension board did not issue a suspension order and the Springfield men are confident that the rate will not be suspended. The Sangamon County operators have long been clamoring for such rates as would open up western territory to them. The Chicago market has been curtailed by the opening up of southern Illinois fields where the coal could be mined more cheaply and which enjoyed the same Chicago rate as the Springfield field. The Springfield operators argue that the new rate will be remunerative to the railroad company and will not be injurious to the operators of the other states. Two large companies have had a practical monopoly of the Kansas City market under the rate which has prevailed and they prevented the Illinois operators from competing with them.

Kincaid—The Herchfield-Piper Iron Works, at Taylorville, recently acquired by the Peabody Coal Co., is to be moved to Kincaid. Plans have been drawn for a building 200x300 ft. Work on it will be commenced immediately. The foundry company is to be reincorporated with a capital stock of $75,000. It will manufacture mine machines and supplies for the mines of the vicinity. About 75 men will be employed.

WYOMING

Glencoe—The town of Glencoe was recently startled one Saturday night by an explosion which shook up the houses in its vicinity. Investigations showed that an attempt had been made to blow up the tipple at the entrance of the mine. The tipple, however, was not badly damaged, but it necessitated some extra work on the following day in order to get it in shape for work Monday morning. It is not known who made the attempt on this building.

FOREIGN NEWS

Blyth, England—Thirteen miners were reported killed early on the morning of Aug. 13, by an explosion in the Ashington colliery near here. The cause of the explosion has not yet been determined.

Paris, France—A decree providing for a maximum price of coal was recently published in the "Official Journal." This price will be fixed by the government.

PERSONALS

Clint Smith, for some time in the engineering department of the Crystal Block Coal Co. at Welch, W. Va., has been forced to resign his position on account of ill health. He will return to his old home in St. Louis, Mo.

E. H. Suender, of Lansford, Penn., assistant to vice-president Edwin Ludlow, of the Lehigh Coal and Navigation Co., has resigned to become assistant to president P. C. Madeira of the Madeira-Hill Coal Co., Philadelphia.

J. K. Roberts, of Beattyville, Ky., has been chosen as general manager of the Beattyville Co., which will develop property in Lee County, Ky., owned by Col. Patrick Calhoun. The old McGuire mines at Beattyville and others will be operated.

James M. McHugh, of Edgewater, Ala., superintendent of the Edgewater mine of the Tennessee Coal, Iron and R.R. Co. and formerly connected with the United Coal Co. in the Pittsburgh district of Pennsylvania, is spending his vacation in and around Pittsburgh, renewing old acquaintances.

Jesse Palmer, superintendent of the Pennsylvania Coal Co. collieries in the Dunmore district, has been promoted to the position of inspector of collieries of the Pennsylvania and Hillside companies, recently vacated by the resignation of A. E. Yetter, who became superintendent for the Susquehanna Coal Co.

John I. Absalom, mine inspector of Montgomery, W. Va., will probably resign shortly and become connected in an official capacity with one of the largest coal companies in the Logan coal field It was reported some time ago that Mr. Absalom had already resigned. This report, however, was incorrect.

OBITUARY

Otto Baumann, aged 61, for many years an official of the Lehigh Valley Coal Co., died recently in Louisville, Ky., at the residence of his sister, Mrs. Louisa Kraft. Interment was in Cincinnati.

W. A. Young, aged 47, of Auburn, Ky., well known operator in Kentucky and West Virginia, died suddenly at his hotel in Huntington, W. Va., recently. Death was the result of a heat prostration.

Henry M. Church, of Marissa, Ill., formerly for several years county mine inspector of St. Clair County, died a few days ago at the home of his sister, Mrs. Eric Johnson, St. Louis. He was 65 years old and a widower. Interment was at Marissa.

RECENT COAL AND COKE PATENTS

Shaking Grate. G. H. Thacher, Jr., Albany, N. Y. 1,185,264, May 30, 1916. Filed May 25, 1911. Serial No. 629,512.

Mine Loading Machinery. F. Billings, Cleveland, Ohio. 1,185,050, May 30, 1916. Filed May 1, 1911. Serial No. 624,406.

Miner's Tool. O. Hanson, Lead, S. D. 1,184,746, May 30, 1916. Filed Mar. 17, 1914. Serial No. 825,368.

Mechanical Stoker. W. T. Hanna, assignor to Mechanical Stoker Construction Co., Cincinnati, Ohio. 1,185,312, May 30, 1916. Filed July 22, 1912. Serial No. 710,857.

Mining Machine. A. Ball, assignor to Sullivan Machine Co., Boston, Mass. 1,185,275, May 30, 1916. Filed July 3, 1906. Serial No. 324,671.

CATALOGS RECEIVED

"National" Matheson Joint Pipe. National Tube Co., Pittsburgh, Penn. Pamphlet. Pp. 72, 8x10 in. This is the third edition of this pamphlet, enlarged and revised and it contains fine reproductions of photographs of actual installations.

Rands Measuring Coal Loader for Locomotives. Roberts and Schaefer Co., McCormick Building, Chicago, Ill. Bulletin No. 31. Pp. 8, 9x11½ in. Illustrated.

Ironclad Longwall Coal-Cutters. Sullivan Machinery Co., 122 S. Michigan Ave., Chicago, Ill. Bulletin No. 73-A. Pp. 32, 6x9 in. This describes both the turbinair and electrically driven types of cutters.

Traveling Water Screens. Chain Belt Co., Milwaukee, Wis. Bulletin No. 64. Pp. 8, 6x9 in. This illustrates and describes water screens designed primarily to remove refuse and foreign material from water before it enters power or any industrial plant requiring large quantities of clean water.

INDUSTRIAL NEWS

Winton, Penn.—For a consideration said to be $260,000 the Dolph Coal Co., on Aug. 10 sold its mines to the Hudson Coal Co. The stock was largely owned by the Dolph family, W. G. Robertson, and A. G. Bennett.

Philadelphia, Penn.—Anthracite shipments for July were 5,422,878 tons compared with 5,103,665 tons in July, 1915. For the year to date shipments totaled 38,854,543 tons, compared with 37,432,656 for the same period last year.

St. Louis, Mo.—St. Louis coal men expect prices to be high the coming fall and winter if there is a general railroad strike. It is the custom in St. Louis for a large part of the winter's household supply to be put in the cellars in August.

Minnequa, Colo.—A byproduct coking plant of 120 ovens capable of producing about 1,500 tons of coke per day is now in course of construction at the Colorado Fuel and Iron Co.'s steel works at this place. This plant will be completed in about one year.

Connellsville, Penn.—It is reported that John M. Jamison, president of the Jamison Coal and Coke Co., has recently purchased 113 acres of coal land in Hempfield Township of Westmoreland County. The consideration involved is stated as being $145,080.

Uniontown, Penn.—Announcement has been made by McClelland Leonard, of Uniontown, of the sale of the Stephenson-Larkin tract of 13,071 acres of coal land in Clay County, W. Va., to the Hartland Colliery Co. The consideration involved is approximately $500,000.

Birmingham, Ala.—The American Coal Corporation recently filed voluntary bankruptcy proceedings listing the liabilities at $482,874, with assets at approximately $1,032,061. The properties of the company are located on the Warrior River. Priestly Toylmin has been named receiver.

Scranton, Penn.—J. R. Fleming & Sons, Inc., of Scranton, have been appointed representatives of the Hyatt Roller Bearing Co., of Newark, N. J., in the anthracite region. The above firm will carry a complete stock of Hyatt roller-bearing journal boxes for both inside- and outside-wheeled cars.

Michel, B. C.—On Aug. 8, an explosion occurred at the new No. 3 mine of the Crows Nest Pass Coal Co., supposed to have been caused by lightning striking the exposed signal wires on the surface, igniting either dust or gas. Thomas Phillips, fire boss and 11 workmen were killed and all the buildings on the surface were destroyed.

Beckley, W. Va.—The Virginian Railroad Co. recently started hauling passengers and freight over its Stone Coal extension. This extension is 9 mi. in length, developing coal territory in Raleigh County. Spur tracks are now being built to new mines and in a short time the Virginian tonnage will be considerably augmented from new operations.

Donora, Penn.—A shortage of gas has compelled the American Steel and Wire Co. to prepare to use powdered coal for furnace heating. This fuel will be used exclusively as a substitute for gas. Experiments have proved satisfactory. It has been found that powdered coal will produce a blast as hot as that obtainable from the gaseous fuel.

Indianapolis, Ind.—The Link Belt Co. is enlarging its malleable foundry at Indianapolis in order to meet the increased demand for its product. The foundry extension will be a one-story building 70x275 ft., with a wing 106x140 ft. The contract has been let for this structure which will house the company's fifth smelting furnace, and will provide space for 60 molders.

Philadelphia, Penn.—A shipment of a cargo of coal will shortly be made from Philadelphia to Piraeus, Greece, the steamer "Lily" having been charted for this purpose. Shortage of coal in Wales, where Greece usually obtains its supply, is given as the cause for the call upon this country for coal. The cargo will consist of about 4,000 tons of bituminous fuel which will come from the mines of Pennsylvania.

Fort Smith, Ark.—J. G. Puterbaugh was recently appointed receiver for the Branner Coal Co., by Judge F. A. Youmans, in the United States District Court. The appointment was made in response to one of the prayers of the McAlester Coal Co. in a suit against the Branner Coal Co. in which judgment was asked upon a note for $6,500 and the foreclosure of a mortgage that had been given upon properties of the company to secure the note. The Branner Coal Co. operates mines at Hackett.

Philadelphia, Penn.—Net income of the Lehigh Valley Coal Co. for the fiscal year ended June 30 was $1,094,922, an increase of $72,107 over the preceding year. The net revenues were somewhat curtailed by unusual labor conditions, a shortage of men and also substantial increases in the prices of materials and supplies, particularly powder and steel. The company produced on owned and leased lands 8,103,187 gross tons of coal, an increase of 14,286 tons as compared with the preceding year.

Birmingham, Ala.—The Louisville & Nashville R.R. has filed tariffs with the Alabama Public Service Commission carrying increases in the preferential rates on raw materials carried to the furnaces in the Birmingham district. Under a recent decision, sustained by the State Supreme Court, the railroads may discontinue any special rate with ten days' notice without the approval of the commission. Hence, if the commission fails to approve the increases, the railroads have the option of discontinuing the preferential rates entirely.

Edmonton, Alta.—John T. Stirling, chief inspector of mines for the province, states that a coal shortage is almost inevitable owing to the falling off in production. In the Edmonton district there are 34 mines capable of producing 1,900,000 tons per year. The actual output during 1915 was 457,980 tons. The number of men available for employment is reduced and during the last 12 mo. the daily production per man has been cut down at least half a ton, so that a daily reduction in output of from 3,000 to 3,500 tons is probable from this cause alone. Inspector Stirling urges the placing of early orders if a famine is to be avoided.

St. Louis, Mo.—The Public Utilities Commission of Illinois has granted a rehearing in the Belleville coal freight-rate case, which was decided adversely to the city and the coal operators last spring. The case involves the rate on coal from the Belleville district to the East St. Louis market. The railroads announced an advance from 37c. to 42c. Objections were filed by the operators and by Belleville, O'Fallon and Collinsville. The Commission allowed the increase. A petition for a rehearing has been acted on favorably. The date for the rehearing has not been set.

Dallas, Texas—The Lone Star Gas Co., which supplies Dallas industries, schools, and large consumers with gas for commercial purposes, has served notice that effective Sept. 1 it will cut off such large consumers because of a shortage of supply and the desire to conserve the gas for domestic uses. The school board is fitting school buildings with furnaces and stoves and many factories, stores and other commercial consumers of gas are equipping their places of business for heating with coal. Retail coal dealers of Dallas are showing activity in preparing for the heavy demand that will be made on them for coal during the coming winter.

Philadelphia, Penn.—Those interested in the coal business in this city have received another statement from the Anthracite Bureau of Statistics bearing upon the impending shortage of coal this coming fall and winter. This prediction is based on the shortage of labor in the mines, the decrease in the percentage of domestic coal produced compared with the total output, the almost total lack of stocks in the storage yards and the decrease in production which is frequently caused in winter by weather conditions. Despite considerable prominence given to the report by the newspapers the statement does not seem to have impressed the coal-consuming public at all, so the retail dealers report.

Toronto, Canada—A school of mining has been organized in connection with the Institute of Technology at Calgary, Alberta. W. A. Davidson, M. E., M. Sc., late manager of the International Coal and Coke Co., of Coleman, Alta., has been appointed supervisor of technical instruction in mining. He graduated from McGill University in 1909, and has had practical experience in coal mining in Nova Scotia and Alberta. Mr. Davidson will organize technical instruction in mining by means of classes in the leading mining centers. During the year the necessary equipment will be installed at the institute for the analysis of coal and also for analyzing mine air and gases, and eventually it is proposed to equip the power plant so as to test coal for heat production on a commercial scale.

Market Department

General Review

Anthracite wholesale trade active. Strong demand for bituminous. Exports heavy. Lake movement handicapped by scarcity of vessels. Middle Western steam consumers accumulating reserve stocks.

Anthracite—The retail trade is quiet but the wholesale market is strong in every particular as is evidenced by the fact that the individuals are quoting the full company circular, almost without exception. A few of the forehanded retailers are beginning to cover their requirements, but as a rule this trade is displaying a remarkable lack of interest in buying, due in part to the fact that collections, in some instances, are much delayed. A touch of cool weather this week served to create a slight buying movement. Various rumors and newspaper reports eminating from semi-official sources to the effect that there are indications of an acute fuel shortage this winter, has also precipitated some buying and caused a note of anxiety in more remote quarters where shipments are delayed, as for instance at down East points. The operating companies are beginning to anticipate a heavy demand by increasing their working schedules.

Bituminous—While there is no real shortage of soft coal consumers with storage facilities are making efforts to accumulate reserve stocks, and there is scarcely any free coal to be had, while the producers are being crowded for full shipments on their contracts. In addition to this, production is being seriously restricted by car and labor shortages which are becoming steadily worse as the season advances. This combination of constructive factors has driven up prices notably, and most of the larger agencies are so crowded with business on contracts that they are practically out of the market for the time being at least. On orders still to be placed, buyers are noticeably less particular as concerns prices, which is due in part, however, to the fact that most industries are making excellent profits. In spite of a temporary softening of British coal prices, the export business here continues at record-breaking proportions, the Hampton Roads shipments for last week having crossed the 400,000-ton mark for the first time in the history of the piers.

Lake Trade—Interest centers now on the scarcity of both cars and labor. The heavy consumption continues unabated in all departments, and operators are generally hard pushed to meet their contract obligations. The urgent demand for steam coal has resulted in a slight over-production of the domestic sizes, which are difficult to move in some instances, but retail dealers are beginning to show some interest in the matter of obtaining their supplies, which will tend to relieve this difficulty shortly. The shortage occasioned by the West Virginia floods has not been entirely made up yet, though a portion of this tonnage is being placed in other districts. Prices are generally strong all along the line, and show every indication of further advances early next month. In spite of substantial premiums being offered, Lake shippers are having great difficulty in getting vessel tonnage, and some delays are also being occasioned by the strike of the dock workers at the upper Lake ports.

Middle West—Steam coal is in active demand, consumers showing a disposition to accumulate reserve stocks, and the production is somewhat limited, due to the curtailed output of domestic coal. Some of the large consumers of screenings who have heretofore generally been able to fix their own prices find their position reversed. Some orders are being held up in anticipation of lower prices, and the release of these will stimulate renewed activity, and have a further beneficial effect on quotations. A number of price advances are scheduled to take place, effective Sept. 1, and some operators are hesitating to commit themselves further on contracts. A new feature in this section is the withdrawal of practically all the high grade coals from the market. Statistics indicate a considerable falling off in the shipments to the upper ports, and a severe winter will necessitate buying considerable all-rail coal for use in that section.

A Year Ago—Readjustment in anthracite freight rates creates uncertainties in the trade. Indications of a firmer tone in bituminous. Negotiations on permanent contracts in Europe. Lake trade fails to make any improvements. Middle Western consumers show some interest in contracts.

Business Opinions

Boston News Bureau—It is a most interesting situation, unprecedented and difficult to diagnose. The one factor of supreme importance is the continuation of the war. We do not appreciate even now the stupendous earning power of the country. All the time people are telling us that this prosperity is only temporary, but we continue the pace, and there is nothing in sight to indicate the end. Of course we shall continue to expand so long as the war lasts, and the man is a wizard who can predict with any degree of certainty when that will end. The new British loan in this country of $250,000,000 at 5% for two years does not look very favorable for early peace. After a certain period of hesitation, sentiment in the commercial world is becoming more confident. New war orders are being received and the money will be here to pay for them, a part on signing of contract, the balance on delivery.

Iron Age—The distinct change in the steel market which came with the closing of the first of the large war and other export contracts late in July has now developed into a volume of domestic buying such as has not been seen in weeks. At the same time the buying on war account has swelled to very large proportions. It is now estimated that 3,000,000 large shells are included in the contracts of the past two weeks, and in addition 500,000 tons of shell steel has now been placed by the Allies, two large steel companies taking the bulk of this. On the shell business deliveries run to Apr. 1, 1917, and on the steel blooms, forgings and rounds for the Allied Governments, to July 1.

American Wool and Cotton Reporter—The raw wool market during the past week has been quite active, sales in Boston totaling about 4,000,000 lb. Woolen and worsted mills are busy and continued activity is expected with a buying spurt predicted in the near future. The primary wool market is practically out of the West, all the buyers having returned and practically all of the wool taken up. The cotton goods market is strong and further advances in finished goods are not unexpected. Textile machinery of all kinds is in short supply.

Dun—Reassuring developments in the labor situation tend to offset official confirmation of crop deterioration. Optimism is tempered by the reduced harvest prospects, but supplies will meet requirements and confidence in the stability of business is not measurably lessened. Current consumptive demands are sustained in remarkable volume for the period and, though a few cancellations are reported, there is still a general disposition to make extensive provision for the future, which is all the more noteworthy because of the prevailing high prices. Commercial failures this week in the United States are 275 against 274 last week, 284 the preceding week, and 321 the corresponding week last year.

Bradstreet—Neither poor wheat reports nor uncertainty about the outcome of mediation between railway employees and managers halts trade, which proceeds at an unusually good pace. Indeed, the central idea is that the outlook for fall is otherwise most encouraging, that lessened cereal crop yields will be offset by high prices, that export trade in most products is enormous, and that buying power having been so largely increased, a crop event that would have proved well-nigh disastrous in most ordinary years can be endured with comparative equanimity.

Dry Goods Economist—Seasonable weather throughout a large section of the country has stimulated retail selling of summer mechandise. Preparations for the new seasons are going on apace. In the New York market, buyers are very numerous, especially representatives of retail concerns. Large handlers of dry goods are giving close attention to the general trade situation.

Marshall Field & Co.—The week has been marked locally by very brisk trade due to Chicago Market Week and Fashion Show. Merchants have responded to Chicago's invitation to "Come to Chicago" in unusual numbers and trade in general has been stimulated and greatly benefited. The South and Southwest have been particularly well represented. Shipments of goods and road sales are considerably in excess of figures for the same period a year ago. Prices are stronger, and collections are very satisfactory.

ATLANTIC SEABOARD

BOSTON

Hampton Roads prices very firm, dispatch only fair, and shippers close-hauled on sales. Georges Creek comes forward slowly and Pennsylvania grades continue firm. Anthracite shipments by water still behind requirements.

Bituminous—Pocahontas and New River prices are being rigidly maintained on the basis reported last week. Loading is still subject to delay, and only steamers on regular contracts are accepted for anything like prompt dispatch. The volume of coal coming to Tidewater continues to be affected by the shortage of labor and the arrears caused by washouts some weeks ago are still to be made up. For this reason most of the larger agencies are practically out of the market and will confine themselves to old orders for some weeks to come.

In this market on what few orders that are still to be placed there is less dallying on price. Most large consumers are prospering enough so that price does not figure as much as formerly. Buyers realize, too, that there is a marked shortage of marine transportation and that all the coal required at points on or near Tidewater cannot possibly reach this market this season in the usual way.

The past week there has been a notable stirring up of consumers to get coal forward from the various distribution points. Those who have the storage are very insistent on deliveries and because this comes at a time when loading is slow at Hampton Roads and the movement of boats coastwise is hampered by the weather it causes the distributors a lot of embarrassment. This is aggravated by early signs of a probable car shortage on eastern lines early in the fall.

The situation of the Georges Creek factors shows practically no improvement. Like Hampton Roads, slow loading is the rule at the Baltimore piers. The scarcity of miners is also felt in the Georges Creek region and operations that have usually been very dependable are now shortening up on output very materially. No new business is being undertaken and receipts of this grade in New England both all-rail and at Tidewater are very light.

The better grades from Pennsylvania are in good demand, with prices strong, especially for delivery a month or two ahead. Medium and lower grades are also in a strong position, with operators anticipating an active demand later on.

Bituminous quotations at wholesale, f.o.b. loading ports at points designated, are about as follows, per gross ton:

	Philadelphia	New York	Baltimore	F.o.b. Mine
Clearfields	$2.40@3.00	$2.70@3.30	.....	$1.15@1.75
Cambrias and Somersets	2.70@3.15	3.00@3.45	.....	1.45@1.90
Georges Creek (contract)	3.07@3.17	3.37@3.47	$3.00@3.10	2.00@2.10

Pocahontas and New River, f.o.b. Norfolk and Newport News, Va., are $3@3.25. On cars Providence and Boston prices are $5.10@5.20.

Anthracite—There are no new features in hard coal. At Tidewater in particular the movement to New England is very slow indeed. This keeps the demand constant on all the shippers and orders are subject to all kinds of delay. The weather for ten days in August was unfavorable for towing and there are several companies who are two months behind on their shipments. Pea and chestnut are about the only domestic sizes in good supply. Requisitions that call for a liberal allowance of broken, egg, or stove are being passed over for orders that are easier to ship.

NEW YORK

Anthracite shows upward tendency. Supplies not plentiful and seriousness of situation becomes more apparent. Car shortage interferes with bituminous production. Market strong and prices stiff.

Anthracite—Demand for anthracite shows practically no change but the tendency is toward a stronger market. The seriousness of the situation as regards lack of supplies is becoming more noticeable and with the return of vacationists, shortly after Labor Day, dealers look for a much stronger market. Some of the mining companies are already beginning to anticipate the situation and intend to work their collieries every possible minute. It is understood that various outings will be cancelled and it is also said that some operators will ask their employees to report for work on Labor Day.

Chestnut coal continues the easiest of the domestic sizes but it is tightening up and some shippers complain of a scarcity due to the companies sending large tonnages to the West. Egg and stove continue scarce. Pea is shorter but still plentiful with some individuals making concessions.

Current quotations, per gross ton, f.o.b. tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$4.95	.....	Pea	$3.90	$3.80@3.90
Egg	5.35	$5.35	Buck	2.75	2.50@2.75
Stove	5.60	5.60	Rice	2.20	2.05@2.20
Nut	5.65	5.50@5.65	Barley	1.95	1.85@1.95
			Boiler	2.20	

Quotations at the upper ports are generally 5c higher on account of the difference in water freight rates.

Bituminous—Much complaint is heard from bituminous operators and shippers of the lack of cars. Shippers with large contracts are already being pressed for coal and are wondering what the situation will be in a few weeks. Even with the scarcity of labor many operators are unable to get enough cars to take care of their present output which in most cases is far below normal. Shippers look for much higher prices than are now being obtained unless there is a decided improvement in the car situation.

Supplies on hand have not increased and the railroads continue to take large quantities of coal. Not many orders are being taken for shipment at more than a couple of weeks ahead unless at good prices. Prices are strong and some quotations show an increase of from 5 to 10c. over last week. Prices at the mines on the same basis are higher than at Tidewater. Gas coals remain scarce and quotations are strong.

Current quotations, per gross tons, f.o.b. Tidewater, for various grades follow:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.50@3.65	$3.50@3.65	$3.50@3.65	$1.95@2.10
Georges Creek Tyson	3.10@3.30	3.10@3.30	3.10@3.30	1.55@1.75
Clearfield: Medium	3.00@3.20	3.00@3.20	.....	1.45@1.65
South Forks	3.30@3.50	.....	.....	1.75@1.95
Nanty Glo	3.10@3.20	.....	.....	1.55@1.65
Somerset County: Medium	3.00@3.10	3.10@3.25	3.10@3.25	1.55@1.70
Quemahoning	.....	3.00@3.10	3.00@3.10	1.45@1.55
West Virginia Fairmont ¾	.....	3.10@3.20	3.10@3.20	1.30@1.40
Fairmont mine run	.....	3.00@3.10	3.00@3.10	1.20@1.30
Western Maryland	.....	2.95@3.00	2.95@3.00	1.40@1.45

PHILADELPHIA

Anthracite production well absorbed except chestnut. Egg active, with pea in better demand. Collections variable. More tax refunds. Buckwheat only active grade of the steam coals. Bituminous in demand, with some price changes.

Anthracite—Despite the fact that midsummer dullness pervades the retail market shippers are well able to dispose of their entire production with the exception of chestnut size, and this with the collieries working from 50 to 60% full time. The feature of the present market is the great strength of egg size, which is now closely pressing stove in popularity; a number of the larger individuals have declined to take any more orders for this size for shipment this month. Pea coal is also showing signs of strength; the price is well maintained at the full circular figure of $2.70, and a number of large blocks have been placed at that price. Pea is growing stronger all along the line which would seem to indicate that the retail men have given up all hopes of a break in the price on this grade. While many of the larger retail men have large stocks in their yards, it is a well known fact that the large mining companies are practically bare of this size, as well as most of the prepared sizes except chestnut.

Stove coal is still in the greatest demand and the orders for this size will not be filled for August.

Much of this delayed ordering is traceable to the poor collections that the retail men experience every summer. Reports as to collections from different sources are diverse. One large dealer states that he finds payments the poorest he has ever encountered. On the other hand a good-sized suburban dealer, with a tonnage of 15,000 per annum, reports that from the financial standpoint it is the best summer he has ever experienced. In the operating department the consensus of opinion seems to be that while collections could be better, yet at the same time they have been worse.

The agitation for the refund of the tax to the consumers continues quite vigorously through the local press, owing to the fact that about a half dozen of the smaller dealers in the outlying sections have made the refund to their customers. This week the Philadelphia Coal Exchange held a special meeting, at which it was reported this matter was to be taken up. There seems to have been a great deal of secrecy about the meeting, as no particulars were given out, except to reiterate the statement that most dealers in Philadelphia never increased the price of coal to meet the tax. It was also stated at the same time that the principal business transacted at the meeting was the discussion of a method of meeting the mail investigation instituted by the Anthracite Price Commission appointed by the Governor. It is understood that the exchange will employ an attorney to look after the joint interests of the dealers in the matter.

Among the steam sizes buckwheat continues quite active, although the smaller sizes are not showing any particular strength.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide shipment are as follows:

	Line	Tide		Line	Tide
Broken	$3.60	$4.75	Buckwheat	$1.65	$2.55
Egg	4.05	5.15	Rice	1.00	....
Stove	4.30	6.50	Boiler	.90	1.80
Chestnut	4.40	5.45	Barley	.75	....
Pea	2.70	3.60			

Bituminous—There is a strong demand for fuel and orders in hand are far from being filled, although it cannot be said there is an actual shortage, as all consumers seem to be making an effort to get some coal ahead. From the brokers' standpoint the peculiar situation has developed that many of the big buyers of soft coal are purchasing their supplies at prices as low or lower than they can offer. While the car supply recently has been fair, this week witnessed a sudden falling off to about a 50 per cent. quota.

There have been a few unimportant price changes, with fluctuations of 5 and 10c. a ton in a few of the grades. The prices ruling at this time per gross ton at the mines are about as follows:

Georges Crk. Big Vein	$1.90@$2.00	Fairmont gas, mine-run	$1.45@$1.55
South Fork Miller Vein	1.75@ 1.85	Fairmont gas, slack	1.25@ 1.30
Clearfield (ordinary)	1.40@ 1.50	Fairmont lump, ordinary	1.40@ 1.50
Somerset (ordinary)	1.40@ 1.50	Fairmont mine-run	1.25@ 1.35
West Va. Freeport	1.30@ 1.40	Fairmont slack	1.25@ 1.00
Fairmont gas, ¾	1.60@ 1.70		

BALTIMORE

Cooler weather apparently brings thoughts of coal to some consumers who are now ordering. Bituminous prices gradually stiffen.

Anthracite—With weather this week that had almost the twang of fall to it, the thoughts of some seemed turned to fuel, as there was a decided increase in ordering. The fact that the last increase in prices before the fall schedule goes into effect on Sept. 1 may also be a factor in the situation. All sizes remain scarce where dealers are relying on movement direct from cars to carts for delivery.

Bituminous—Most of the mines are urging the railroads to supply more cars, even though labor shortage is still holding down their production to 50 or 60 per cent. capacity. Prices are only quoted by a comparatively few companies. Most of the operators are having their hands full in looking after their existing contracts.

Prices to the trade are about as follows, at the mines, per gross ton: Georges Creek, Tyson, $1.75; Miller vein, $1.60; Quemahoning, $1.60; Somerset, $1.55; Freeport, $1.35; Fairmont, gas, three-quarter, $1.35; same, mine-run, $1.25; slack, $1.20.

HAMPTON ROADS

Exports show slight increase over last week. Coastwise shipments fair. Stocks very light. Spot coal commands good prices.

As will be noted from the list of foreign clearances for the current week exports are slightly in excess of the previous week. Advices from the other side indicate that the British coal market is experiencing a temporary softening of prices. This condition, however, seems to be only temporary and the colliery proprietors decline to quote for future delivery at the current prices. The requirements of the Navy Department are large and considerable further tonnage will be taken for the fleet, due in Hampton Roads Sept. 1.

Coastwise shipments are moving in satisfactory shape. There are quite a few orders in the market for shipment to shallow water Eastern ports and there seems to be some difficulty in securing suitable tonnage for this business. Rates from Hampton Roads to Boston are firm at $1.75@2.

Quotations are as follows: Pocahontas and New River mine-run for cargo $3@3.25 per gross ton; for local consumption $2.75@2.90 per net ton on track; for bunker use $3.30 per gross ton plus 10c. trimming. Anthracite $7.50 per net ton delivered.

Railroad Tonnages—Dumpings over the local piers for the past five weeks compare as follows:

Railroad	Week Ending July 15	July 22	July 29	Aug. 5	Aug. 12
Norfolk & Western	173,347	108,108	139,132	201,133	187,518
Chesapeake & Ohio	93,665	133,897	76,517	100,787	107,459
Virginian	90,989	73,870	80,341	84,569	120,412
Totals	358,001	315,875	259,990	386,489	415,389

Ocean Charters and Freights

OCEAN FREIGHTS

Since our last report, we have chartered an American steamer to load coal from Virginia for Buenos Aires for $14.40, and the British steamer "Trecarne," 6,000 tons, 10 per cent., has been chartered from Baltimore to Buenos Aires, at $15. Among the other fixtures were the British steamer "Nuceria," 6,000, 10 per cent., from Philadelphia to Rio, at $15.50, net, and the American steamer "D. N. Luckenbach," with part cargo, Virginia to Rio, at $15.75 net. Although a number of steamers were chartered to other destinations, none of these fixtures have been reported.

We would quote freight rates on coal by steamer as follows:

West Coast of Italy	$27.60@28.80	Cienfuegos	$5.00@5.25
Marseilles	26.40 about	Port au Spain, Trinidad	5.50 about
Barcelona*2	22.80 about	St. Lucia	5.50 about
Montevideo	15.00 about	St. Thomas	5.50 about
Buenos Aires	15.00 about	Barbados	6.00 about
Rosario	16.80 about	Kingston	5.00@5.50
Rio Janeiro	15.50@15.60	Curacao[1]	4.75 about
Santos	16.00 about	Santiago	5.00@5.50
Chile (good port)	8.00@10.00	Guantanamo	5.00@5.50
Havana	3.80 about	Bermuda	4.25@4.50
Cardenas or Sagua	5.00 about	Vera Cruz	5.00@5.50
		Tampico	5.00@5.50

* Spanish dues for account of cargo. [1] And p.c. [2] Or other good Spanish port.

Note. Charters for Italy, France and Spain read: "Lay days to commence on steamer's arrival at or off port of discharge."

W. W. Battie & Co.'s Coal Trade Freight Report.

VESSEL CLEARANCES

The following vessels have cleared with coal cargoes during the past week:

NORFOLK

Vessel	Destination	Tons
Francesco[16]	Genoa, Italy	3,462
A. Padre[16]	Savona, Italy	2,126
H. F. Kreger[2]	Lisbon	1,856
Hartfield[6]	Buenos Aires	6,698
Atlantide[16]	Italy	8,477
Wagama[17]	Rio de Janeiro	7,068
Viemira[6]	La Plata, A. R.	8,050
Tasmania[16]	Savona, Italy	4,993
D'Aosta[16]	Bagnoli, Italy	4,007
Letizia[16]	Naples, Italy	2,168
Annie II[17]	Pernambuco	2,379
Nentmoor[18]	Civita Vecchia	5,424
Luigi Accame[16]	Italy	3,746
Llanishen[16]	Spezia, Italy	5,628
Ancon[3]	Cristobal, C. Z.	7,500
Costante[16]	Palermo	4,769
P. H. Crowell[6]	Rio de Janeiro	4,024
Harlem[2]	Marseilles	6,637
Paddington[16]	Savona, Italy	5,372
Confidenza[16]	Italy	4,532
Bryssel[15]	Havana, Cuba	990
River Forth[6]	Buenos Aires	343
Francis[8]	Para, Brazil	1,921

NEWPORT NEWS

Vessel	Destination	Tons
Nolisement[18]	Dakar, F.W.A.	7,671
Chaparra[17]	Havana, Cuba	1,901
Ovid[7]	Montevideo	5,261
Veturia[4]	Rio de Janeiro	7,493
Manicia[14]	Buenos Aires	2,878

NEWPORT NEWS (Cont'd.)

Vessel	Destination	Tons
River Forth[6]	Buenos Aires	5,401
Selene[18]	Italy	5,316
Alderney[21]	Caldera, Chile	2,673
Strathleven[2]	Marseilles	5,400
Trevarrack[8]	Buenos Aires	6,367

PHILADELPHIA

Vessel	Destination	Tons
Malm[4]	Cienfuegos	
Lodaner	Havana	
Kenwood	Bahia Blanco	
Pendleton	St. L. du Rhone	
Cantrabico[1]	Valencia	
Timandra	Buenos Aires	
Harald	Havana	1,917
Oregon	Havana	

BALTIMORE

Vessel	Destination	Tons
Michalnos	Savona, Italy	4,800
Nea Ellas	Genoa, Italy	5,317
Viva	Valparaiso	387
Trehowke	Argentina	6,826
Penobscot	Havre, France	2,774
Absalom	Costa Rica	3,060
Claveresk	Felton, Cuba	6,100
Rancagua	Valparaiso	993

[1] Atwater & Co.
[2] Baker Whiteley
[3] Barber & Co.
[4] Berwind-White
[5] C. G. Blake Co.
[6] Castner, Cur. & Bul.
[7] Ches. & O. Coal A. Co.
[8] Ches. & O. C. & C. Co.
[9] Crozer-Pocahontas Co.
[10] Dexter & Carpenter
[11] Flat Top Fuel Co.
[12] Hasler Brothers
[13] Houston Coal Co.
[14] Maryland C. & C. Co.
[15] New River Coal Co.
[16] Pocahontas Fuel Co.
[17] Smokeless Fuel Co.
[18] C. H. Sprague & Son
[19] White Oak Coal Co.
[20] Northern Coal Co.
[21] W. Virginia Coal Co.

OCEAN CHARTERS

Coal freight charters have been reported as follows:

PHILADELPHIA

Vessel	Destination	Tons	Rate
Skogstad	Martinique	2,357	
Marita	Santos	1,641	
Bartram	R. Janeiro	920	
Stevens	Lisbon	1,032	$14.00
Perecler	Nassau	255	
Lily	Piraeus	1,934	
Harald	Havana	1,921	
Benpark	Genoa		
Claveresk	Antilla	2,441	

BALTIMORE

Vessel	Destination	Tons	Rate
Juan	S. Marta	841	
Palmer	St. Nazaire	1,377	
Aries	R. Plata	1,968	
Penobscot	Havre	1,666	
Birkhall	R. Janeiro	2,731	$15.75
Tenzan M.	R. Janeiro	2,881	
Absalom	Port Limon	1,353	

VIRGINIA

Vessel	Destination	Tons	Rate
	Buenos A.		$14.40
Lucken-bach	R. Janeiro	1,857	15.75
Stanhope	Rosario	1,828	16.20
Viva	Valparaiso	1,640	
Rose Lea	Buenos A.[1]	1,817	15.60
Don	Pernambuco	1,064	
Isthmian	Antofagasta		
E. Park	Brazil	2,208	

ATLANTIC RANGE

Vessel	Destination	Tons	Rate
Trecarne[2]	R. Plata	2,679	15.00

[1] Option Rosrio $16.20. [2] September.

COASTWISE FREIGHTS

There is very little fluctuation in current marine freights, particularly from Hampton Roads. Sentimentally, it might be said the freight market was slightly firmer this week but actual charters were very few in number. Dispatch is so uncertain on charters in the open market that both merchants and vessel owners are cautious about commitments. Rates, therefore, are still nominally $1.85 on large carriers, Hampton Roads to Boston, and $2 on small tonnage. To Providence and other Sound ports from Hampton Roads the range would be 15@20c. less.

For New York loading to points on Long Island Sound rates are up materially from last quotations; $1.05@1.10 is asked, and $1.05 has been paid on barges upward of 1,000 tons.

LAKE MARKETS

PITTSBURGH

Car shortage not seriously interfering with production. Lake shipments fairly heavy. Prices unchanged.

While thus far the car shortage has operated to curtail production in only a slight degree there are more serious fears entertained for the future. It may be recalled, however, that months ago there were predictions made in some quarters that before this date there would be a regular blockade. Production in the Pittsburgh district is substantially the same as for several weeks past. Lake shipments are large, and there has been no serious trouble experienced on account of the strike at upper Lake coal docks, machinery having supplanted hand labor so largely.

While steel production has been curtailed for several weeks on account of hot weather no appreciable decrease has been observed in the coal requirements against contracts. Departments are not closed, the output being simply reduced, and boilers, heating furnaces and gas producers must be fed just the same. Demand for prompt coal is rather light, but prices are very well maintained and predictions are made that higher prices will shortly rule. We continue to quote prompt coal as follows: Slack, 95c.@$1; mine-run, $1.35@1.45; ¾-in., $1.45@1.55; 1¼-in., $1.55@1.65, per net ton at mine, Pittsburgh district. The circular price for mine-run continues at $1.50.

BUFFALO

Car shortage increasing and is worse than the scarcity of men. Consumers are still not anxious. Anthracite only normal.

Bituminous—Complaint is now confined almost entirely to the lack of cars at the mines. All roads are short of cars and the prospect is that the situation will grow worse right along. Not over 60 per cent. of capacity can be depended upon. Shippers who have contracts are worrying because they are not able to fill them. On the other hand, if coal is on track unsold it is often a hard matter to move it. Quite an amount of mine-run arrived here recently, which was sold with much difficulty.

Quotations are as follows:

	Pittsburgh	Allegheny Valley	Penn Smokeless
Lump	$2.95	$2.75	$2.80
Three-quarter	2.85	2.60	.....
Mine run	2.75	2.50	2.60
Slack	2.40	2.30	2.60

Prices are per net ton, except east of Rochester and Kingston, Ont., where they are per gross ton.

Anthracite—The trade is still quiet. So long as the summer feeling prevails among the consumers there will be little buying. The mines are running at a slow rate and Lake vessels are as hard to handle as the consumers; Lake rates are going up and still the docks have to beg for tonnage. Practically all coal moved by the Lake is unloaded on the docks of the shippers, to wait there till winter.

Shipments by Lake for the week dropped to 56,450 tons, of which 23,000 tons cleared for Duluth and Superior, 10,300 tons for Fort William, 8,000 tons for Milwaukee, 7,500 tons for Chicago, 3,500 tons for Port Arthur, 2,600 tons for Ashland and 1,550 tons for Racine. Rates are now from $1 down, this being paid to slow Lake Michigan vessels down and all the way from 35 to 85c. to fast ones. The Lake Superior rates remain at 30c. to leading ports and 40c. to side ports. An advance is looked for soon.

The August anthracite circular is maintained firmly, both by regulars and independents as follows, per gross ton, f.o.b.:

Grate	$5.85	Chestnut	$6.35
Stove	6.10	Pea	5.00
Egg	6.10	Buckwheat	3.50

A reduction of 10c. per ton is allowed on all sales during the month.

TORONTO, CAN.

Trade generally quiet. Good stocks on hand. Railway embargo keeping back shipments. Anticipated increase in prices.

Trade is rather quiet, anthracite being more active than bituminous. The yards are generally well stocked but the embargo placed by the Grand Trunk Ry. on importations via Black Rock and Detroit is causing some delay in deliveries which is not expected to be of long duration. The pending increase in railway freight rates will cause some advance in prices.

Quotations for best grades per short ton are as follows: Retail, anthracite egg, stove and nut, $8; grate, $7.75; pea, $6.75; bituminous steam, $5.25; screenings, $4.50; domestic lump, $6; cannel, $8. Wholesale, f.o.b. cars at destination, bituminous three-quarter lump, $4; screenings, $3.25; Pennsylvania smokeless lump, $4.50; Pocahontas lump, $5.50; slack, $3.75.

DETROIT

Steam coal buying restricted to small sizes. Very little demand for domestic grades. Lake shippers find few boats available.

Bituminous—With the prospect of a possible railroad strike, steam consumers are attempting to stock up, and a slightly more active demand will probably develop in the next few weeks. Most of the buyers seem to want nut, pea and slack at present. The supply seems adequate and prices are steady at 90c. at the mines. Mine-run is easier and sells $1.10 to $1.15 at the mines while three-quarter lump ranges from $1.25 to $1.35. Not much business is being done in domestic coal due to lack of men to unload cars and the expectation of lower prices. The supply of coal coming to Detroit seems ample for present needs and the quantity on consignment is not sufficient to weaken the market.

Anthracite—Some of the retail dealers are buying anthracite, but the orders are usually small. Both consumers and retailers appear to be holding off. There is likely to be a belated demand from all sides and that the situation at present indicates that those who delay may find they are unable to get coal when they want it. Delays in shipment of stove size are already reported.

Lake Trade—Efforts of shippers to get boats for moving coal over the Lake routes are meeting with very little success. With freight rates as high as 75c. a ton offered on shipments to Milwaukee and Chicago and $1 a ton to side ports on Lake Michigan, vessel owners are reluctant to close contracts as delivery of cargoes at these ports takes vessels away from Lake Superior, where larger profits are made in loading grain and iron ore for the downbound trips. Even for Lake Superior ports, shippers offer 20 to 45c. over the early contract rate to induce carriers to handle coal.

CLEVELAND

All grades affected by dock workers' strike. Lake shipments held up. Slack coal makes a sharp advance.

The dock workers' strike at the head of the Lakes has caused all Lake shipments to stop, and has also tightened up the car supply, as practically no coal has been unloaded at the Lake ports and the majority of empties are being used for ore coming down. The operators are applying as much of their coarse coal as they can on contracts and there has been no recession in prices on this grade.

Practically 60 per cent. of the slack tonnage results from Lake coal and with the Lake shipments stopped, slack advanced 25c. per ton; it is selling now at prices equaling or better than mine-run prices. The indications are now that slack will not be offered at less than the contract price, which is $1, for the balance of the year, but at the same time it will not go any higher than at present as the large consumers will crush mine-run as soon as they realize the supply of slack will not be enough to meet requirements.

Following are the market prices, per short ton, f.o.b. Cleveland:

	Three-quarter	Mine-run	Slack		Three-quarter	Mine-run	Slack
No. 8	$2.10	$2.00	$2.10	Youghiogheny	$2.60	$2.50	.....
Cambridge	2.10	2.00	2.10	Pittsburgh	2.60	2.50	.....
Middle Dist.	2.00	1.90	2.05	Pocahontas	....	3.05	....
Hocking	....	....	1.95	Fairmont	2.10	2.00	$2.10

COLUMBUS

Domestic buying increasing. Heavy movement in the Lake trade. Steam consumption continues to expand.

The trade has been fairly active during the past week. Domestic business is gradually increasing and there is more strength displayed in every field. Prices are generally strong and there is every indication that an advance will be in order early in September.

The best feature at this time is the increase in domestic orders, due to dealers stocking up to take care of their fall business. Dealers are now accumulating a surplus of Pocahontas, West Virginia splints and Hocking to be able to care for the demands of householders. Rural dealers are also in the market for larger amounts. One of the worst features is the shortage of labor, which prevents the prompt unloading of cars; in many cases it has been necessary for yardmen to pay from 25 to 30c. per ton for unloading. Retail prices are strong at the levels which have prevailed for some time. Anthracite is moving in large quantities and the same is true of Pocahontas and smokeless.

Lake trade is still active and the tonnage going from Ohio and West Virginia mines to the head of the Lakes is large. Reports from the Northwest show that the movement off the

docks to interior points is active, thus avoiding congestion. Lake prices remain strong. Chartering of boats is difficult, as there are few bottoms available at present. Lake rates on tramp freighters are exceedingly high.

The steam trade is one of the staple features and the tonnage used for manufacturing purposes shows no diminution. Buying in the open market is attended with difficulty as prices are high. Some of the larger consumers have been trying to accumulate surpluses as in former years, but prices are not attractive. There is a better demand for the small sizes and prices have advanced. Railroads are taking quite a good tonnage for the movement of trains.

The production in many Ohio fields has been curtailed by the car shortage. Eastern Ohio is probably the worst sufferer, but there is a shortage in other districts. The Hocking Valley R.R. is probably the best off as to equipment.

Prices on short tons, f.o.b. mines, are as follows:

	Hocking	Pomeroy	East Ohio		Hocking	Pomeroy	East Ohio
Re-screened lump..	$1.60	$1.80	.....	Egg.....	$1.30	$1.35	.....
Inch and a quarter.	1.50	1.60	$1.40	Mine-run.....	1.20	1.20	$1.15
Three-quarter-inch	1.40	1.45	1.35	Nut, pea and slack.	.85	.85	.80
Nut.....	1.25	1.30	1 25	Coarse slack.....	.75	.75	.70

CINCINNATI

Increasing activity noted in all departments. Steam grades especially strong, and domestic improving. Spot coal scarce and moves readily.

While the recent extremely hot weather has had the usual psychological effect on the domestic market, this is the only weak spot in the trade. Demand in other quarters is very lively, at prices which show a constant upward trend. Nut and slack is again at a premium, the better grades commanding $1 a ton f.o.b. mines, and in some cases more.

The strong market for steam grades has resulted in a heavy production, and this has contributed slightly to the dull state of the domestic market, which is still rather quiet. With the fall season immediately ahead it is certain that domestic business will improve, as retailers so far have delivered comparatively little coal to their customers, and in many cases still have the bulk of their winter's supply to buy.

The limited car supply continues a feature, the floods of last week in the Cabin Creek and Paint Creek districts of West Virginia contributing an element which will also tend to strengthen the market.

LOUISVILLE

Car and labor shortage handicapping Kentucky operators, while demand has been increased by the West Virginia floods. Domestic coal stronger.

Continued inability of railroads to supply sufficient cars to eastern Kentucky mines is the feature of the current situation. The demand for steam coals is insistent and there are reports that plants dependent on this field for their supply are about to close down. The West Virginia floods have tended to divert buyers to the eastern Kentucky field and it is expected that prices under competitive bidding will advance rapidly. The domestic demand is improving and retailers are in the market again. Settlement of the strike in western Kentucky, will mean an increased production from that field shortly.

COKE

CONNELLSVILLE

Prompt furnace coke stiffer. Less apprehensions for future on account of increase in byproduct ovens. Production and shipments decreased somewhat.

The spot coke market has stiffened. There are still some offerings of questionable grades at less than $2.75, but any coke offered at as low as $2.50 would be distinctly off grade, and there have been occasional sales of standard grade at $2.85. The market, however, is very quiet in point of tonnage moving. There is very little demand from consumers, and brokers buy only occasionally, when they can pick up bargains to apply on their contracts. The offerings are very limited, the great majority of operators not having a carload to spare.

While production, curtailed of late by the hot weather, may be expected to be more subject to the dictation of the operators within a week or two, there is generally a stronger tone in the situation due to possibilities of lower Connellsville coal being salable for fuel purposes in case the coal market stiffens further, and also to the prospect that the byproduct ovens being completed, and which have been considered so menacing, will draw coal largely from the Connellsville region. There is nothing being done as to contracts and the quotation given is practically a nominal one. We quote: Spot furnace, $2.75@2.85; contract furnace, $2.50; prompt foundry, $3.25@3.50; contract foundry, $3.25@3.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Aug. 5 at 394,200 tons, a decrease of 22,855 tons, and shipments at 394,-047 tons, a decrease of 23,850 tons.

Buffalo—The market continues very firm, with some grades advancing. The demand is in excess of the output and the consumption promises to keep up for an indefinite time. Men are hard to get at the ovens. Quotations are $5.25 for best 72-hr. Connellsville foundry, $5 for 48-hr. furnace, $4.40 for high sulphur and $4.25 for stock coke.

Chicago—Demand still exceeds supply. Byproduct ovens do not seem to be able to reduce accumulated orders on hand. Nominal prices per net ton f.o.b. cars, Chicago, are as follows: Connellsville, $6@6.26; Wise County, $6@6.25; byproduct foundry, $6@6.25; byproduct domestic, $4.95@5.30; gas house, $4.50@4.75.

MIDDLE WESTERN

GENERAL REVIEW

Prices firm. Car shortages give operators much concern. Open shipments of all grades sold at higher prices. Steam market very strong.

Steam coal continues to be absorbed liberally, and there is some disposition to accumulate a surplus for the coming winter, though higher prices in the open market are mitigating against this movement. Small steam sizes are the most active with prices unduly strong. The supply of screenings is inadequate, due to curtailed production of domestic lump. Some of the large public service corporations, heavy buyers of screenings, who almost fixed the market prices of fine coal in former days, are now being obliged to pay the operators' price to get their requirements filled.

No bargain offerings of any kind are noted. Eastern shipments are generally light, with prices well maintained. It is authoritatively stated that about 2,000 cars of unbilled coal are on hand at the mines in central and southern Illinois, the major portion of which contain domestic sizes. Delayed buying will cause higher prices later. Some southern Illinois operators have already informed the trade that the advance on domestic sizes will be 15c. Sept. 1, instead of 10c.; Hocking shippers are likely to increase their prices 15c. per ton the middle of this month, and some of the Indiana companies are discussing advancing prices Sept. 1.

Threshing coals are in greater demand. Operators are hesitating about making further contracts for winter deliveries, and as a result many retailers and individual consumers are uneasy. Box-car shipments are becoming increasingly scarce to this territory. Producers of domestic sizes state that dealers are still very slow in placing orders for their stocks. The situation is being further complicated by the fact that a severe shortage of cars is expected later in the season. A new development in Western trade centers is that many consumers have been told that shippers have no more high-grade coals to offer, and the consumer has been forced to turn to low-grade coals to fill up the gap.

With four months of the Lake shipping season now over, it is estimated that the shortage of bituminous coal at the upper Lake docks by the close of navigation will be near 3,000,000 tons, provided no serious interruption to shipments occurs during the balance of the season. Coal famine conditions in the Northwest will largely depend upon climatic conditions next winter; should there be a winter as severe as the last one no doubt considerable additional rail coal will have to be shipped into that territory. Crop conditions are not as good as expected, and this tends to curtail the fuel consumption.

CHICAGO

Improved demand in Chicago for domestic sizes. Steam coals retain strength. Smokeless shipments scarce. Anthracite trade dull.

Prices on southern Illinois domestic sizes are rigidly upheld, and increased ordering is apparent. By the end of the month it is felt that it will only be a question of supplying the demand. Franklin County operators will ask $1.90 in September for domestic lump and egg; screenings are averaging around the dollar mark. A heavy percentage of coal is moving from Williamson County mines under contracts with the railroads and other large industries. Saline County operators have had restricted production, owing to shortage of cars.

The mines of the central Illinois district are operating about half time. An exceptionally heavy tonnage of steam

sizes is moving northward. Kansas City jobbers are negotiating with the Springfield operators to supply screenings in that territory under contract, owing to the low rate in effect over the Chicago & Alton Ry.

Prices have stiffened on both Indiana domestic and steam sizes, with a better demand from all quarters. Industrial absorption of screenings is increasing in Chicago. Higher prices will undoubtedly cause many consumers in Indiana cities to consider the advisability of laying in their supplies without further delay. The car situation does not improve, and some Indiana operators feel that the railroads are not providing equipment for mines on account of the unprecedented traffic in higher classes of freight. A number of contracts for school coal have been let at higher prices than last year. The demand for screenings is sufficient to take care of the entire production in the Clinton field, which is now quite heavy. In the Sullivan and Linton fields idle mines are being reopened.

In the smokeless market the heavy demand and activity in mine-run causes continued comment. The curtailment of transportation from the New River district, due to floods, has resulted in restriction of shipments to inland points. Indications point to mines concentrating more on mine-run coal and shipping less sized production, owing to the heavy calls for straight mine-run. Chicago dealers have placed increased orders during the week on account of the railroad labor controversy, fearing that later transportation may not be availablee.

Hocking domestic sizes are in better demand. Kentucky shipments have been restricted to this territory by reason of shortage of cars. Storms and floods in the splint field have prevented shipment of normal tonnage to this territory, with consequent stiffening of prices.

Anthracite orders are still very backward, but greater activity in hard coal is anticipated before the close of the present month. An increased amount of chestnut has been ordered from the country districts.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars mines:

	Williamson and Franklin Co.	Springfield	Carterville	Clinton	Knox and Greene Cos.
Lump	$1.65@1.75	1.60@1.70	$1.65@1.75	$1.60@1.65	$1.50@1.60
Steam lump	1.35@1.50	1.25@1.35	1.35	1.30@1.35	1.30
2½ and 3-in. lump	....	....	....	....	1.40@1.50
1¼-in. lump	....	....	....	....	....
Egg	1.65@1.75	1.25@1.35	1.65@1.75	1.50	1.50
Nut	1.60@1.75	1.25	....	1.35@1.50	1.40@1.50
No. 1 washed	1.65@1.75	....	1.65@1.75	....	....
No. 2 washed	1.60@1.75	....	.90@1.00	....	....
No. 1 nut	1.65@1.75	....	....	....	....
No. 2 nut	1.50@1.50	....	....	....	....
Mine-run	1.25	1.15	....	1.10@1.15	1.15
Screenings	.95@1.00	.90@ .95	....	.95@1.00	.90@ .95

	Harrisburg & Saline Co.	E. Kentucky	Pocah. & W.Va.Smok'l.	Penna. Smokeless	Hocking
Lump	$1.65@1.75	$1.70@2.00	$1.90@2.00	$1.75@2.00	$1.70@1.80
1¼-in. lump	1.40@1.50	....	....	....	1.50@1.60
Egg	1.65@1.75	1.35@1.60	1.85@2.00	1.75@2.00	1.50@1.65
Nut	1.60@1.75	1.15@1.25	1.75@1.80	1.50@1.75	....
No. 1 nut	1.65@1.75	....	....	....	....
No. 2 nut	1.65@1.75	....	....	....	....
Mine-run	1.35	1.00@1.15	1.45@1.50	1.35@1.50	1.25
Screenings	90@ .95	.90@ .95	....	....	....

KANSAS CITY

Market steady and prices firm. Car shortage and labor difficulties cause some anxiety.

There is just enough steam coal coming in to supply the demand and prices are steady. A slight car shortage and the delay of miners and operators in the Southwestern district in reaching an agreement are causing a barely perceptible disturbance of the market. The probable increase in the price of gas in Kansas City and the report of extraordinary productions of oil have been matters of discussion with reference to possible coal sales.

The result of the conferences between the railroad employees and the railroad officials in the East is watched carefully by consumers in this district.

Prices per short ton f.o.b. mines, with freight indicated to Kansas City, are as follows:

Cherokee lump	$2.25	$0.90	Morning Glory (Higginsville)	$2.35	$0.60
Cherokee mine-run	1.85	.90	Arkansas Semi-Anthracite	2.75	2.10
Cherokee nut	2.25	.75	Arkansas Anthracite sizes	4.10	2.20
Cherokee mill	1.70	.75	Arkansas Anthracite lump	3.85	2.20
Cherokee slack	1.35 to 1.50	.75	Arkansas Anthracite chestnut	7.25	2.60
Lexington block	2.25	.40	Pennsylvania grate	6.85	2.60
Parlor block	2.25	.40	Pennsylvania egg	7.10	2.60
Richmond	2.25	.40	Waverly lump	2.00	.40
Waverly nut	2.00	.40			
Novinger No. 1 lump	2.00	.40			
Novinger Co. C	2.00	.60			
Novinger nut	1.85	.60			
Farmer's Block (Red Label)	2.65	.60			

PRODUCTION AND TRANSPORTATION STATISTICS

COAL MOVEMENT

The following is a statement of car loads of bituminous coal and beehive coke that originated on 49 railroads in July, 1916, compiled from reports received by the Geological Survey by noon, Aug. 15, 1916:

	July, 1916	June, 1916	July, 1915
Beehive coke	47,569	50,102	46,110
Bituminous	376,775	380,041	364,396

IMPORTS AND EXPORTS

The following is a comparative statement of coal imports and exports of the United States for May, 1915-16, and for the 11 months ending May, 1914-15-16, in long tons:

	May		Eleven Months		
Imports	1915	1916	1914	1915	1916
Anthracite, total	31	.....	5,182	12,336	7,199
Bituminous, total	89,140	109,041	[1]1,266,411	1,310,889	1,517,498
United Kingdom	957	504	10,684	33,919	8,175
Canada	77,213	106,973	938,182	1,036,285	1,351,632
Japan	4,510	1,050	83,851	77,490	71,450
Australia	6,040	514	230,081	160,947	84,545
Other countries	420	.....	3,613	2,248	1,696
Coke	3,631	5,286	[1]98,234	83,973	56,333
Exports					
Anthracite total	422,604	450,785	3,525,849	3,329,552	3,358,655
Canada	412,479	442,508	3,469,646	3,269,000	3,234,691
Argentina	.....	.....	.....	.....	2,926
Brazil	.....	1	.....	.....	2,473
Uruguay	.....	.....	84	60,552	600
Other countries	10,215	8,276	56,119	.....	117,965
Bituminous total	1,404,277	1,984,100	14,519,400	12,479,585	16,769,604
Italy	285,027	160,465	.....	1,245,260	2,566,538
Canada	589,512	1,310,026	10,678,541	7,551,864	9,258,795
Panama	34,321	48,030	336,617	295,664	445,630
Mexico	30,247	18,156	280,526	369,166	202,093
Cuba	107,650	115,427	1,048,379	990,222	1,132,298
West Indies	34,471	44,229	532,108	413,486	539,205
Argentina	108,730	100,583	129,432	406,058	676,670
Brazil	65,183	107,087	229,059	404,780	617,458
Uruguay	14,401	10,278	56,252	91,671	117,505
Other countries	134,735	69,819	1,228,486	711,414	1,213,412
Total coal	1,826,971	2,434,885	18,045,249	15,809,137	20,128,259
Coke	74,581	91,147	697,794	533,845	894,985
Bunker coal	647,918	741,167	7,124,527	6,334,773	6,813,383

[1] Part year only.

FOREIGN MARKETS

GREAT BRITAIN

Exports—British exports for June and the six months of the past three years were as follows:

	June			Six Months		
To	1914	1915	1916	1914	1915	1916
Russia	705,715	3,281	.....	2,009,789	19,420	1,690
Sweden	391,533	285,693	142,453	1,800,093	1,628,068	808,799
Norway	152,058	202,877	246,875	1,247,501	1,359,295	1,168,815
Denmark	219,991	281,255	186,542	1,389,551	1,537,240	1,204,082
Germany	823,978	.....	.....	4,202,651	.....	.....
Netherlands	163,574	113,171	110,395	872,526	762,209	578,577
Belgium	140,565	.....	.....	880,366	.....	.....
France	965,326	1,546,559	1,497,923	6,818,125	8,460,758	8,481,012
Portugal[1]	102,929	86,512	64,560	650,349	533,452	488,436
Spain[4]	253,377	152,248	222,309	1,756,681	1,046,031	1,101,193
Italy	632,393	399,353	497,040	4,533,077	3,068,374	2,704,214
Aus. Hung.	83,892	.....	.....	462,164	.....	.....
Greece	66,664	32,446	4,279	374,132	219,489	88,727
Roumania	25,514	.....	.....	156,720	.....	.....
Turkey	60,116	.....	.....	309,307	6,557	.....
Algeria	75,139	70,481	54,549	610,528	525,495	419,741
Portugal[6]	9,258	10,716	35,199	97,993	112,784	140,410
Chile	34,035	13,297	4,219	302,205	35,430	16,532
Brazil	135,821	32,040	12,441	727,128	341,270	164,092
Uruguay	66,334	19,865	.....	390,608	204,092	152,527
Argentina	210,369	74,970	28,648	1,825,940	958,072	565,356
Channel Is.	10,036	7,590	8,374	76,853	61,117	50,183
Gibraltar	14,526	32,218	38,413	170,629	190,066	251,316
Malta	35,129	28,805	1,598	242,657	86,276	31,398
Egypt[2]	211,818	65,864	60,323	1,636,842	685,796	356,394
Aden[3]	5,708	28,777	.....	85,569	89,179	5,908
India	12,800	50	.....	110,802	12,160	8,722
Ceylon	26,096	469	7,189	172,695	31,990	20,543
Miscell'ous.	99,526	68,769	42,369	673,457	357,970	266,794
Coke	73,163	52,713	139,574	517,609	419,709	744,247
Briquettes	192,034	115,404	98,683	1,044,360	624,875	684,979
Total	5,999,417	3,725,423	3,503,955	36,148,907	23,377,174	20,504,687
Bunker	1,681,477	1,065,779	1,110,632	10,182,157	7,400,321	6,578,207

[1] Includes Azores and Madeira. [2] Including Anglo-Egyptian Sudan. [3] And dependencies. [4] And Canaries. [6] West Africa.

Note—The figures in the above table do not include Admiralty and certain other shipments.